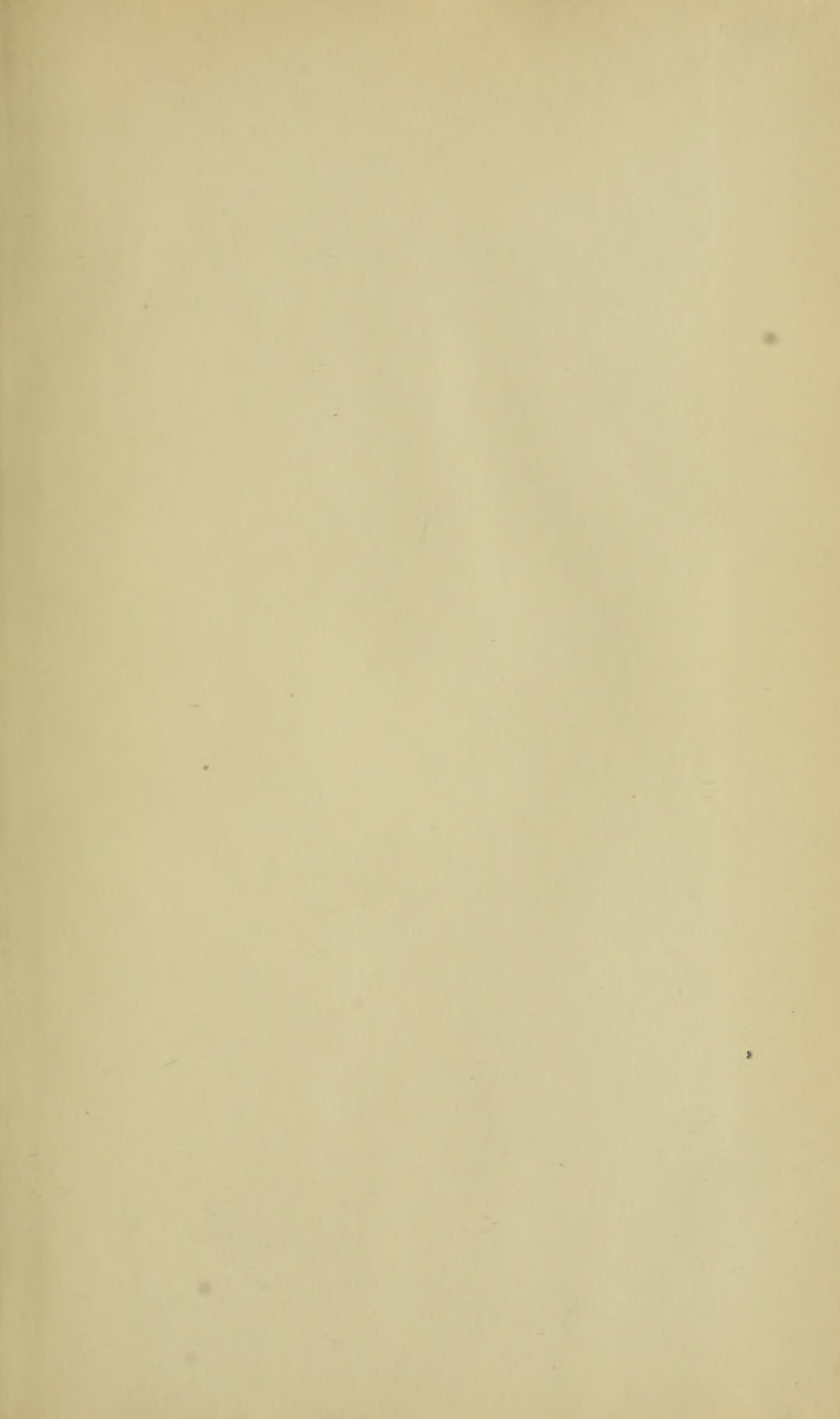


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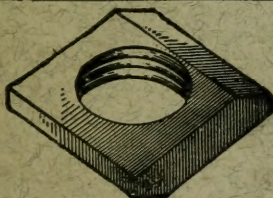
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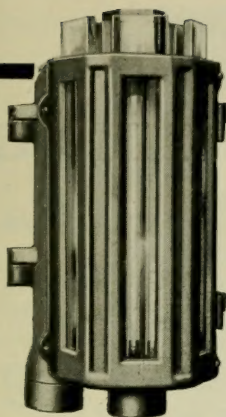
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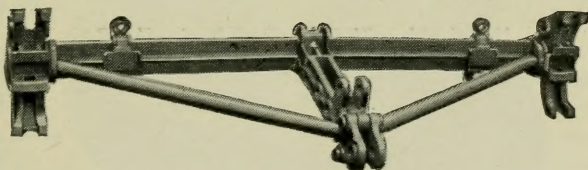
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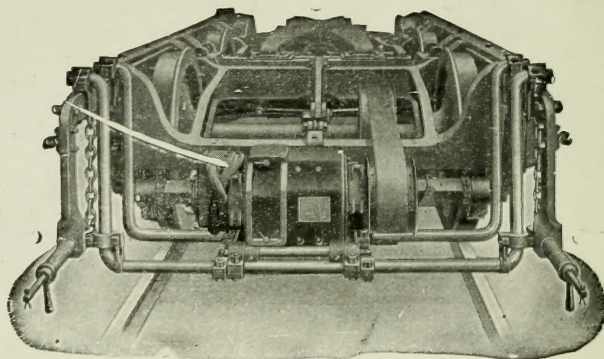
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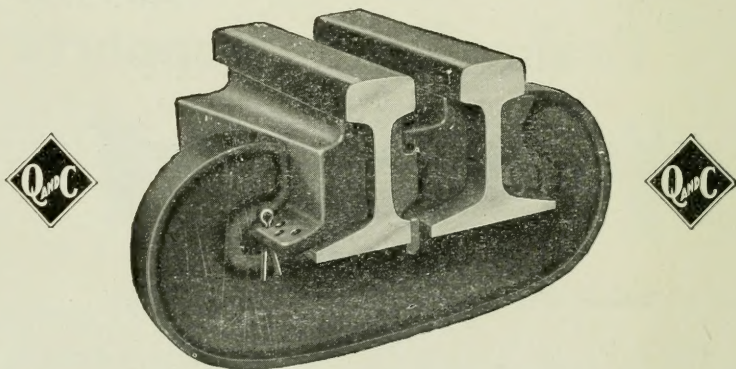
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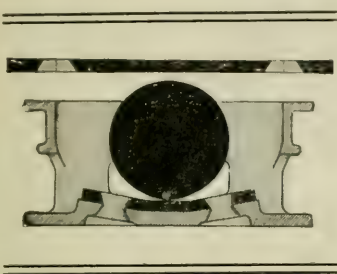
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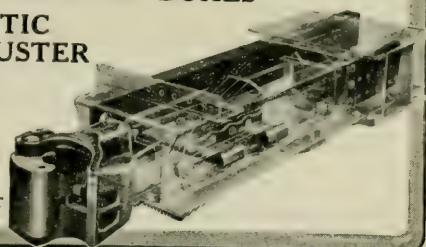
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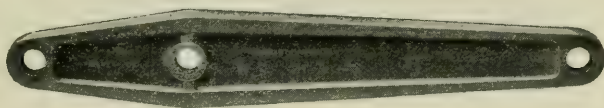
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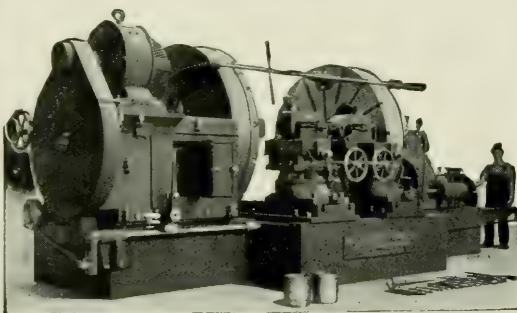
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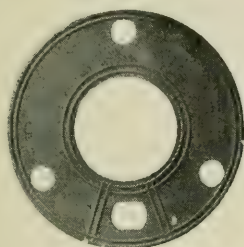
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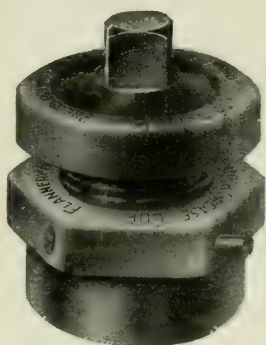
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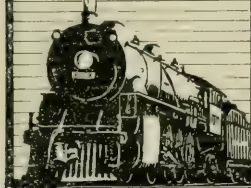
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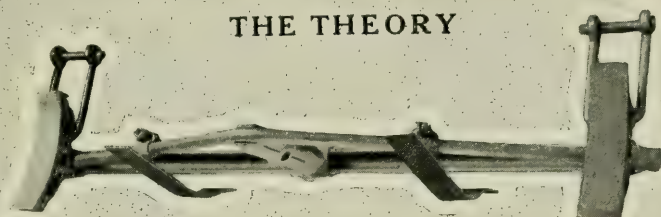
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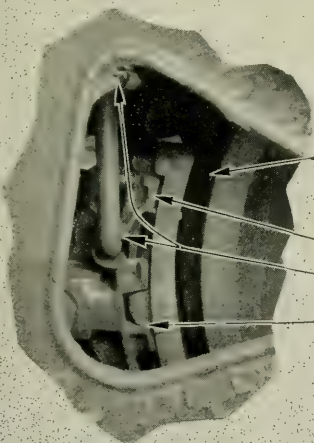




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Cruikshank, J. C.	Long, R. M.
Dambach, C. O.	Luddy, W. E.
Davis, C. E.	Maliphant, C. W.
Davis, Chas. S.	Maloney, J. J.
Devans, E. J.	Mann, N. T.
Emery, E.	Mills, C. C.
Endsley, Louis E.	Minnick, F. G.
Farrington, A. R.	Mitchell, F. K.
Farrington, R. J.	Mitchell, W. J.
Fowler, W. E., Jr.	Mitchell, W. S.
Freshwater, F. H.	Muir, R. Y.
Fults, J. H.	McLaughlin, H. B.
Furch, G. J.	O'Leary, J. J.
Geisler, Joseph J.	Orchard, Charles
Gibson, D. W.	Painter, Joseph
Gilg, Henry F.	Palmer, E. A.
Gillespie, W. J.	Parke, F. H.
Glenn, J. H.	Passmore, H. E.
Guignon, W. E.	Penn, William
Hale, Charles E.	Pickels, H. D.
Hale, O. R.	Posteraro, S. F.

Prince, Albert
 Purnell, C. S.
 Redding, D. J.
 Redding, R. D.
 Richardson, H. R.
 Robinson, George H.
 Ryan, Wm. F.
 Sattley, E. C.
 Seiss, Wm. C.
 Smith, F. M.
 Stamets, Wm. K.
 Stoller, Karl M.
 Stucki, A.
 Thomas, C.

Van Vrankin, S. E.
 Walker, J. W.
 Walther, G. E.
 Weissert, W. J.
 Wheatley, Wm.
 Whitaker, U. A.
 White, A. B.
 Wikander, Oscar R.
 Wildin, G. W.
 Wolf, H. M.
 Woodling, George V.
 Wright, Roy V.
 Wyke, J. W.
 Wynn, M. E.

VISITORS

Barrett, P. J.
 Bergman, O.
 Brown, Homer
 Cunningham, W. P.
 Daerr, N. A.
 Dodds, Thomas F.
 Glatz, J.
 Grove, L. T.
 Harris, J. L.
 Hill, H. H.
 Hill, W. D.
 Holaday, N. M.
 Hunter, B. E.
 Hurst, Harry
 Jex, W. A.
 Kraus, Thomas A.

Lewis, S. B.
 Livingston, J.
 Masters, W. C.
 Morris, W. S.
 Musser, L. J.
 McElravy, J. W.
 McWilliams, G. M.
 Olsson, N. A.
 Purkhard, R. L.
 Reardon, M. J.
 Schrontz, S. B.
 Stalter, H. A.
 Snyder, Wm. A.
 Sterling, C. C.
 Twinley, F. C.
 Walters, George

Wood, E. H.

PRESIDENT: The Roll Call will be dispensed with, the record of attendance being had from the registration cards:

If there is no objection, the reading of the minutes of the previous meeting will be dispensed with, as they are to appear in printed form.

The Secretary read the following list of applications for membership:

Boyce, William H., Commercial Mgr., Pittsburgh Railways Co., 435 Sixth Ave., Pittsburgh, Pa. Recommended by C. O. Dambach.

Boyle, Edward A., Salesman, The Okonite Co., First National Bank Bldg., Pittsburgh, Pa. Recommended by William Penn.

- Burkhard, Raymond L., Machinist, P. & L. E. R. R., 927½ Russellwood Ave., McKees Rocks, Pa. Recommended by R. M. Long.
- Calahan, Charles R., Salesman, Standard Auto-Tite Joint Co., Union Bank Bldg., Pittsburgh, Pa. Recommended by D. J. Redding.
- Cogswell, F. R., Director of Traffic Promotion, Pittsburgh Railways Company, 435 Sixth Ave., Pittsburgh, Pa. Recommended by C. O. Dambach.
- Damrau, Edward A., District Manager, The Okonite Co., First National Bank Bldg., Pittsburgh, Pa. Recommended by William Penn.
- Gibson, Alex A., Office Manager, Cyrus Wm. Rice Co., 135 Oakview Ave., Edgewood, Pa. Recommended by William Penn.
- Goff, J. P., Asst. Trainmaster, P. & L. E. R. R., 615 Montour St., Coraopolis, Pa. Recommended by J. P. Kelly.
- Masters, William C., Sales Engineer, Graham Bolt & Nut Co., 1046 Vance Ave., Coraopolis, Pa. Recommended by W. E. Fowler, Jr.
- Minnetti, Charles A., Retired, 1903 Carson St., Pittsburgh, Pa. Recommended by William Penn.
- McCarthy, F. W., Asst. Supt., Transportation, Pittsburgh Railways Co., 435 Sixth Ave., Pittsburgh, Pa. Recommended by C. O. Dambach.
- McElravy, J. W., Freight Agent, P. & L. E. R. R., Fourth and Walnut Sts., McKeesport, Pa. Recommended by J. P. Kelly.
- Phillips, Frank R., General Manager, Pittsburgh Railways Co., 435 Sixth Ave., Pittsburgh, Pa. Recommended by C. O. Dambach.
- Pugh, Clifford F., Railway Watch Inspector, P. & L. E. R. R., House Bldg., Pittsburgh, Pa. Recommended by H. R. Richardson.
- Pugh, John R., Watch Inspector, P. & L. E. R. R., House Bldg., Pittsburgh, Pa. Recommended by H. R. Richardson.
- Reardon, M. J., General Yardmaster, P. & L. E. R.R., 638 Fifth Ave., Coraopolis, Pa. Recommended by H. Kessler.

Sterling, C. C., Engine House Foreman, Union R. R., 339 Albert St., Turtle Creek, Pa. Recommended by J. W. Wyke.

Zollinger, Samuel W., Car Distributor, P. & L. E. R. R., 1717 Brighton Road, North Side, Pittsburgh, Pa. Recommended by F. P. Ketterer.

PRESIDENT: These applications will be referred to the Executive Committee in due course, and upon approval by them, the gentlemen will become members without further action than the payment of the current year's dues.

At our last meeting a resolution was offered that a letter, together with suitable flowers, be sent to one of our past presidents, who was at that time lying ill at home, and the letter and flowers were sent to Mr. Frank R. McFeatters. Simultaneously with receipt of a letter from Mrs. McFeatters acknowledging receipt of the flowers, the Secretary of the Railway Club of Pittsburgh was notified of his death, it occurring only three days after the passage of the resolution in the Club.

Out of respect to the memory of the late Frank R. McFeatters, I am going to ask that you all rise and stand for just a moment. (This request was complied with).

The next order of business is the reading of notices. Mr. Secretary, will you read the notices?

SECRETARY CONWAY: Mr. President and gentlemen, our President was not familiar with some part of the announcements to be made this evening. Perhaps I should apologize for not calling his attention to the fact that we had lost by death three very prominent members of this Club, and not only of this Club, but perhaps of other clubs of the country, and I will announce the deaths of these gentlemen: Mr. F. R. McFeatters, General Superintendent Union Railroad, died on October 25, 1925. Mr. G. M. Basford, President of the G. M. Basford Company, of New York City, died suddenly on October 26, 1925. Mr. George A. Post, President George A. Post Company of New York City, died of heart failure on the evening of October 31, 1925.

These three names come to us with a great deal of familiarity. Many who are in the room tonight will recall that it has been but a short time since Mr. Post addressed this Club. They will remember his pleasing manner and his jovial nature and his gift of entertaining that was enjoyed by the members of this Club upon different occasions.

Mr. G. M. Basford, another citizen of standing in the community and the nation, a man widely known, and I think I might say very safely that no other man held the same distinction as one who supported and worked in the interest of Railway Clubs, all of the clubs of the country, more than G. M. Basford. I know that our speaker tonight can realize the truth of that fact, but I think about two years ago I never read anything quite so profound and so truthful in the way of exploiting the benefits to be derived from Railway Clubs than a story written by G. M. Basford of New York City.

PRESIDENT MINNICK: Gentlemen, in selecting the speaker tonight, the Subject Committee called upon a gentleman who has long been identified with the work of the Railway Club of Pittsburgh. In going back into the archives of the Railway Club of Pittsburgh, we find that it was organized on October 18, 1901, at a meeting held in the Hotel Lincoln with forty-nine charter members, of whom the speaker tonight was one. It is a little interesting to find that at that meeting Colonel David P. Jones, of the United States Navy, gave a talk on some of the underlying causes for the total destruction of the Spanish fleet at Santiago. That is going back quite a ways.

Mr. Roy V. Wright has the distinction of reading the first technical paper before the Railway Club of Pittsburgh, and that occurred on the night of December 23, 1901. At that time he was located here, and since that time he has been engaged in larger fields, acquired a great deal of experience, a much broader vision, but he returns to us tonight the same wholesome gentleman who left us a good many years ago to engage in other work. It is with a great deal of pleasure that I present to you Mr. Roy V. Wright, who will talk to you on the subject of "Looking Ahead." Mr. Wright.

LOOKING AHEAD

A Better Type of Leadership and More Carefully Trained Workers Must Be Provided

By ROY V. WRIGHT,
Managing Editor, Railway Age, and Editor,
Railway Mechanical Engineer

Mr. President and Fellow Members: This is a much larger and very different sort of gathering from the meeting that we held almost a quarter of a century ago when I made my first effort before this club. Incidentally, that effort was not made very freely, but under orders from my chief, Mr. L. H. Turner, one of the organizers of the club. Naturally it was a little bit difficult to build the programs for the first few meetings of the club. Mr. Turner called me into his office one day and said, "Roy, we are up against it for a speaker for the Railroad Club meeting next month; it is up to you to prepare a paper."

I replied that my office was simply swamped with emergency work and that it was out of the question to prepare the paper.

His answer was, "Nothing is impossible. It is up to you to make good." (Many, many times since I have had occasion to appreciate Mr. Turner's good advice and the friendly and fine interest he has taken in "his boys").

When I asked for a suggestion as to what to talk about, he indicated that that also was up to me, but that I must have some sort of paper for the next club meeting.

I do not believe there could have been a more frightened chap anywhere than I was when I attempted to speak to the club two days before Christmas in 1901. As a matter of fact, I think it almost spoiled my Christmas. (Laughter.)

Naturally, Mr. Chairman, it is flattering to be preceded by such a nice introduction. My experience in Pittsburgh recently has been such, however, that I am just a little bit hazy as to my qualifications to appear before you. For instance, just a week ago, when Strother Keiser, one of the young men of the Chesapeake & Ohio, who was making an address at the dinner of the Younger Railroad Men's Conference, told how much inspiration and good he had received from a conference of the younger men on the Chesapeake & Ohio last spring, he commented upon the fact that so many of the higher officers had attended the meeting, including President W. J. Harahan and Vice President R. N. Begien. Then turning and looking at me

he said, "And Mr. Wright made an **intelligent** address." (Laughter).

I judge from the heartiness of your laughter that some of you attended the dinner, and recall the incident.

I returned to New York day before yesterday after a rather strenuous trip and had a few minutes in the office before getting ready to come out here. I noticed a post card announcement of this meeting on my desk, in which it was indicated that I would speak on "Looking Ahead." This was followed by some sort of a statement in small print which I did not take time to read. My secretary, however, with a peculiar sort of emphasis, indicated that it might be best to look it over. Now, I should very much like to have the reputation of being a man of vision, but this is not quite what I found on the announcement. It presented a statement as to why I was qualified to make a "visionary outlook ahead." (Laughter).

You see that I am not quite sure whether you folks in Pittsburgh are trying to "kid" me or not. I have a sort of suspicion that it was rather difficult to secure anybody from a distance to speak to the club on the evening after Thanksgiving. It was necessary to pick an easy mark and jolly him along a bit. However, it doesn't hurt me to talk and you may have to suffer some punishment in sitting still and listening.

Importance of the Railways

I have been impressed with the fact for a long time that if there is one thing in which the railways are weak it is in getting over to the employes and to the public just what the railways have meant in the opening up and development of our country and their vital importance to the country today. If we thoroughly understood this ourselves and could get it over to the employes and the public we would have a very different situation in this country, so far as railway regulation is concerned. As a matter of fact, this great country does owe its development, from the economic, political and social stand-points largely to our wonderful system of transportation. The interesting thing is that this can be determined by even a superficial examination, and yet in this intense age we do not stop long enough to consider the question and attempt to think it through. We are so busy with the problems of the moment or those that are immediately ahead of us that we fail to look backward occasionally, in order to get a proper perspective and see just what the railroads have meant to us. If you want to

visualize the importance of the railroads, contrast our country with China, which had a well developed civilization centuries before our country was even thought of.

Comparison With China

China has an area 40 per cent greater than that of this country. Its population is almost four times as great. Surely we would expect to find its natural resources thoroughly developed. As a matter of fact its vast mineral and agricultural resources away from the seacoast and rivers are almost entirely undeveloped because of the lack of transportation. The United States has 8.6 miles of railroad for every 100 square miles of territory; China has only .16 of a mile of railroad for every 100 square miles of territory. In other words, this country has 54 times as much railroad mileage per unit of area.

Or, expressing it in another way—there is a mile of railroad in the United States for every 406 persons; in China there is a mile of railroad for every 50,000 persons. I chatted with a young Chinese engineer some time ago. In discussing this question he said, "Oh, if we only had your railroads! We do not have the capital to build them and we do not have people with faith enough to put the project through. With your railroads we could develop the great natural agricultural and mineral resources in the interior and very greatly raise the standard of living of our people, who today are living largely in congested communities along the seacoast and the rivers."

Ninety Years Ago

What were the conditions in our country when the steam railway was first inaugurated a little more than 90 years ago? Henry S. Haines, in his book on "Efficient Railway Operation," says: "It (the railroad system) had been preceded by no highway system, unless the national road over the Alleghenies may be so considered. The Atlantic seaboard was served principally by sailing vessels on the few navigable streams. Steamboat service had been more extensively developed on the Great Lakes and on the Mississippi River. * * * * As the country was virtually devoid of roads, the railroads preceded them; in fact, they preceded civilization. They were not intended to care for existing traffic, but to create it and to populate vast uninhabited areas; for they were extended into regions still in a primitive state, verging on barbarism."

You can imagine what courage it took for our forefathers to project the railroads into undeveloped territory with the ex-

pectation that sufficient traffic might be developed to support them. Much capital was required, which it was exceedingly difficult to raise; moreover, the building of the railroads required a high degree of engineering skill. Such engineers as were available had no precedents to follow and it was necessary for them to blaze the trail in more senses than one. Surely those men who risked everything they had to build the railroads and thus open up and develop our country are entitled to a high degree of honor.

Afraid of Steam Railroads

We must remember also that the general public was quite skeptical about the value of the steam railroads and much positive opposition had to be overcome. F. A. Cleveland and F. W. Powell in their book on "Railroad Promotion and Capitalization" make this statement: "In Connecticut, we are told, an eloquent divine went about lecturing in opposition to railroads, declaring that their introduction would necessitate the building of a great many insane asylums, as people would be driven mad with terror at the sight of locomotives rushing across the country with nothing to draw them. And the townspeople of Newington in the same state, having learned that a line of railroad was projected through their neighborhood, are said to have presented to the directors a remonstrance which represented that they were a peaceable, orderly people, and begged that their quiet might not be interrupted by steam cars and the influx of strangers."

This naturally sounds strange to us, and yet it reflects a condition that existed less than a century ago. We have been projected almost like a comet into the midst of this intense industrial age and we fail to recognize how short a distance we are, in the standpoint of time, from an almost primitive state of civilization. We so quickly become accustomed to higher standards of living that we fail to appreciate what rapid progress we are making. If those of you who are approaching middle age will think back and compare the conditions, which existed in your boyhood with those which your children enjoy today, you will catch something of what I have in mind. Our forefathers, and even our fathers lived under very different conditions than exist today.

125 Years of Progress

No more clearly can we find this reflected than in a statement which was made at a meeting of the American Institute

of Electrical Engineers in 1917 by Dr. Robert A. Millikan, one of our greatest scientists. You will recall that he was awarded the Nobel prize in science in 1923. Doubtless you may have heard the following statement before, but it is well worth while repeating. He said:

"Do you realize that within the lifetime of men now living, within a hundred years, or 130 years at most, all the external conditions under which man lives his life on this earth have been more completely revolutionized than during all the ages of recorded history which preceded? My great-grandfather lived essentially the same kind of a life, so far as external conditions were concerned, as did his Assyrian prototype 6,000 years ago. He went as far as his own legs or the legs of his horse would carry him. He dug his ditch, he mowed his hay, he did all the operations of his industrial life, with the power of his own two arms, or the power of his wife's two arms, with an occasional lift from his horse or his ox. He carried a dried potato in his pocket to keep off rheumatism, and he worshipped his God in almost the same superstitious way. It was only in the beginning of the nineteenth century that the great discovery of the ages began to be borne in upon the consciousness of mankind—the discovery that man is not a pawn in a game played by higher powers; that his external, as well as his internal destiny is in his own hands."

Think of it! In 1800, only about 125 years ago, our forefathers lived much the same sort of life, so far as cultivating the soil, making their clothes and homes, and in the conveniences they enjoyed, as did their Assyrian prototypes of 6,000 years ago! This is a challenging statement. Think how far and how fast we have progressed in the past century and a quarter. We are so used to our great factories and transportation systems and our remarkable systems of communication, that it is hard to grasp the fact that few mechanical inventions had been made prior to 1760 and that in 1800 people were, to a great extent, still using the appliances in use at the time of the Pharaohs.

Beginnings of Modern Industry

While a series of inventions was made in England beginning about 1760, it was many, many years before these could be utilized in the way of mass production, because there was no way of distributing the products beyond the immediate vicinity unless they were manufactured on the seacoast or on

navigable rivers. In the United States we do not find any great amount of invention taking place until the early part of the nineteenth century. England has this year celebrated the one hundredth anniversary of its steam railroads. This country must wait several years before it can celebrate a similar anniversary.

If we assume that the steam railroads were first started in this country in the year 1830, we can get some idea of what the improved transportation methods have meant to this country, by comparing conditions of that year with those of 1912, a pre-war year, and one for which I found it easy to secure comparable statistics. The population of this country increased from 12,800,000 in 1830, to 96,900,000 in 1912, or $7\frac{1}{2}$ times. Meanwhile, the national wealth increased from \$2,653,000,000 in 1830, to \$187,739,000,000 in 1912, or 70 times.

This remarkable increase in national wealth was due, in large part, to the fact that, because of our efficient and more adequate transportation systems, we were able to centralize manufacture at the places where each particular class of goods could best be produced and thus to bring about mass production.

Mechanical Power Vs. Human Slaves

To bring the picture into sharper focus recall that through the 50 years from 1830 to 1880, the growth of industry and transportation in this country was naturally rather slow, but that since that time progress has been much more rapid. In 1880, for instance, we are told that the use of power per worker in industry was 1.2 h.p. Today this figure has increased to 4.4 h.p. Dr. Fred R. Low, the editor of *Power*, made the following statement in his presidential address before the American Society of Mechanical Engineers: "At a recent gathering of engineers and scientists, one of the speakers quoted Bageout (a noted English economist), to the effect that during the early ages of civilization slavery was essential to progress, because only through the enforced labor of the many, could the few find time to think. It is within only comparatively recent times," continues Dr. Low, "that in the burden of supporting the race, the drudgery of the struggle for existence has been transferred to power operated machinery."

Human slaves have been replaced by steam, electric and water power, so that today each industrial worker is controlling power that is equivalent to the physical energy of a

large number of slaves. Moreover, it cost a considerable amount of money to maintain a slave or a horse for a year. It costs very little on the other hand to maintain the equipment to use mechanical power. Dr. Low, in the above-mentioned address, compiled some statistics as to the installed horsepower capacity in this country and accompanied them with this comment: "If these figures are correct (704,266,000 h.p. installed capacity), there is installed for each unit of our population prime mover capacity capable of generating about 1 h.p., and with our previous estimate of 2,000,000 ft. lb. as a day's work for a man, this would be equivalent to the ability to produce for each man, woman and child of our population, if they demanded it, physical service equivalent to that which could be rendered by nearly 150 slaves."

What the Railroads Have Done

Think of what this has meant in our standards of living. Fifty or 75 years ago the working day allowed the average worker little time for recreation and leisure. Conditions are very different today. May I remind you again that it would have been absolutely impossible to have brought this about without cheap and adequate transportation, which, in this country, has been provided largely by the steam railroads. Remember, also, that without our improved systems of transportation and communication it would have been very difficult, if not impossible, to have brought the people of the different sections of this country close together in political unity. We can today see the effect that lack of transportation is having in this respect on China.

I am wondering if those farmers out West who are today fighting a much-needed increase in railroad freight rates, have ever stopped to think this problem through. That vast territory would never have been developed and their lands would never have had much value had it not been for the railroads going ahead of civilization and building up the territory with the hope that sufficient traffic might develop to warrant the project.

Not only did the railroads do this, but many of them have developed strong departments of development, which have sent experts into the agricultural districts to demonstrate to the farmers how to increase production and make more money.

Doubtless, some of you are acquainted with the research work which has been done by Dr. David Friday, one of our leading economists, who has given much attention to the econ-

omics of transportation. Some time ago he had occasion to make a comparison of conditions in 1900 with those of 1920. In the first 20 years of this century the population of the United States increased approximately 40 per cent. In spite of this increase there was no increase in the number of people engaged in agricultural pursuits. This was due to the greatly increased production per individual, caused by the use of improved methods and more efficient facilities and machinery.

We can get some idea of the remarkable advances that have been made in agriculture from a statement which was made by Dr. John Martin Thomas, president of Rutgers University, in his recent inaugural address. He was, of course, referring to a much greater period of time than the first two decades of this century when he said: "It used to take four hours of manual labor to grow a bushel of wheat; now it takes 10 minutes. There used to be five men on the farm for one man in the town; there are now two men in the town engaged in industry and commerce for each man engaged in agriculture."

It is noteworthy that the railroads, through their departments of development, made a considerable contribution to the educational effort which has been responsible for these results. During the first 20 years of this century, although the population of this country increased only 40 per cent, the number of people engaged in manufacturing pursuits doubled. Moreover, due to the fact that the efficiency of each worker in industry was increased by at least 10 per cent, the total production was much more than doubled. This is one reason why we are today enjoying in this country such a high standard of living you have only to visit some of the European countries which are much older than ours and to make a comparison of the standards of living with those in this country, to realize how fortunate we are, and what this industrial development during the early part of the century has meant to us as individuals and as a nation.

I well remember the profound impression that was made upon us when on returning from abroad a year ago we came in sight of the Statue of Liberty. There were many native Americans on board, returning from their summer vacations. They were impressed, if not deeply touched, by the return to their own country, but the real expressions of appreciation came from those men and women who had been born on the other side of the water, had spent part of their lives in this country and then had gone abroad to visit their relatives, some of them

possibly intending to remain in their native land. While in Europe, we had seen how some of them were disillusioned when they returned to their native countries, but even thus, we were hardly prepared for the sincere and heartfelt way in which they thanked God from the very bottom of their hearts that they were privileged to return to and live in a land such as ours, with all of its material advantages, and where their children would have opportunities immeasurably beyond those open to children in their native lands. Again let me remind you that our remarkable transportation systems, with their splendid and cheap service as compared to railroads in other countries, have been a large factor in making these ideal conditions possible.

"Muddling Through"

Dr. Sidney L. Miller, in his book on "Railway Transportation," in considering this question of studying and understanding the importance of railway transportation, makes this statement: "Concerning this great problem (regulation) the present generation of American citizens should reach a definite decision; no longer should we 'muddle through.'" Undoubtedly there would be much less "muddling" done if railway employes and the public generally had a clear realization of the importance of the railroads to the country.

Take a man like Senator Albert B. Cummins of Iowa, who for years was a bitter opponent of the railroads in his state and who was largely responsible for the extremes to which the regulation of the railways has been carried. Fortunately there came a time when he awoke to the economic value of the railways and he has been giving the latter part of his life in attempting to develop a great, constructive program to foster, rather than to destroy them.

The Present Situation

This is a long introduction to the topic which was announced for this evening, but it provides a background which is quite essential if we are to discuss intelligently some of the large problems which will confront the railroads in the future. Just a few words about the present situation.

You all know the improvements that have been made in loading and unloading freight cars promptly and keeping them in motion. The shippers and receivers of freight have greatly appreciated the more prompt and reliable service of the last few years. Merchants and manufacturers carry much less stock because of this more expeditious and reliable service, and in

some cases the savings in interest on the investment are said to largely offset the freight charges, as compared to the conditions existing five years ago. Some months ago I was traveling with a railroad executive on one of the southeastern roads. As we drew into a station and the trainmaster came aboard the president's car, the executive asked him: "Tom, what is the oldest car in the yard?" I did not at first grasp the significance of this question, but assumed that possibly it referred to a program of retiring some of the older equipment.

The trainmaster promptly gave the number of a car owned by a foreign road.

"Why it is being held?" the president asked.

Just as promptly the trainmaster said that delay in forwarding the car was due to some difficulty with the shipping directions and clearly showed that it was due to no fault of the railroad organization, but rather to neglect on the part of the shipper. When I found that officers from one end of the railroad to the other were asking their subordinates in the operating department, "What is the oldest car in your yard," I recognized why it was that this particular railroad had a remarkable record for the number of miles made per day by freight cars passing over its line.

What would it not mean if this question were asked in the same way at all of the division points and yards in this country? Certainly it would have a large effect in speeding up the movement of freight cars.

Stop for a moment and think, if you will, of the remarkable development that has been made in the design and utilization of steam locomotives in the last few years. Not so long ago electrical engineers were saying that it was only a question of time when steam locomotives would be replaced by electric locomotives, because the former could make only 120 or 150 miles a day, while the electric locomotive could, if necessary, run 24 hours a day. I need not go into detail with this audience as to what has been done in lengthening the locomotive runs and greatly improving the utilization of steam locomotives, nor need I review the improvements in design and capacity of locomotives, which have resulted in a gradually and steadily increasing revenue freight train load. I think we all realize what this has meant in increasing the net revenue.

Then there is the remarkable improvement that has been made in the conservation and utilization of fuel and the vast expenditures which have been made in improving facilities and

equipment in the interests of more efficient and economical operation. I am wondering, however, whether we are getting the public to realize this to the extent to which it should. In addition to all of these things, an entire evening could be spent in considering the wonderful improvement which has taken place in the last few years in the morale of railroad organizations—a factor of even greater importance than that of materials and equipment.

What of the Future?

What does the future hold for the railroads? There are a number of technical engineers in the audience this evening; some of you can tell better than I of the possibilities of improvement in our motive power, rolling stock and other facilities. We recognize, also, that we are on the edge of what may be almost a revolution in the methods of handling freight, of getting it more quickly and cheaply from the shipper to the receiver.

Some of you may be concerned over the competition of the motor bus and motor truck. There are some of you who are thinking about how improvements in aviation may affect the railroads and how they may be co-ordinated into our national transportation system. One thing we must remember, and that is, that it is hardly possible to develop a cheaper way of shipping freight (if water transportation, which is slower and not generally available, is excepted than over steel rails. It is true that the railroads may just now be handicapped by excessive regulation and taxation, but in the last analysis, if we can get the people generally to recognize the fundamental importance of the railways and the necessity of conserving them, it would seem that this whole problem could eventually be solved in such a way as to insure to the public that combination of types of transportation which will best serve the country as a whole. If that can be done, and much depends upon educational work by the railroads on and in their behalf, then, in my opinion, we can well afford to be optimistic over the future of the railroads, so far as regulation and taxation are concerned.

The Greatest Problem

May I suggest, however, that the greatest future problem of the railroads and one which will have a larger effect upon improved operation than more effective equipment and facilities and will greatly influence the attitude of the public toward the railroads, is that of providing better trained men and a higher

type of leadership. We have given entirely too little attention to the recruiting of our forces, to seeing that men who enter the service are fitted for the tasks to which they are assigned, in coaching them after they enter the service and then seeing that they are given the right sort of training and are given an opportunity to fit themselves for promotion. I need not remind you of the careless way in which some men are taken into organizations, never being properly introduced to their associates and to their work, but being literally pushed into the job and allowed to work out their own salvation. This does not make for efficiency and more economical operation.

Helping the Young Men

A number of you attended the Younger Railroad Men's Conference which was held in Pittsburgh last week. While it is only a small effort in the right direction, you may want to know more about it and what it promises to mean for the future of our railroads. Gathered here in a third annual convention were 238 young men from 46 railroads, 31 states and two Canadian provinces; they were accompanied by a large number of railroad officers and Railroad Y. M. C. A. leaders. These young men came from almost every department on a railroad and represented a great variety of interests. To a large extent they were selected by railroad officers, and in some cases with the help of Railroad Y. M. C. A. secretaries, because they seemed to be young men of promise who could profit by coming to such a conference and could carry back a helpful message to their fellows.

Briefly, the conference was designed to promote three things: (1) Acquaintance among young railroad men from all over the continent; (2) knowledge of the importance and dignity of the transportation industry, and (3) promotion of the ideal of service in the life-work of the delegates.

I wish you could visualize what it means to these young men coming from all parts of the country, and some of them never having been far away from their homes, to have the opportunity of mixing up and getting acquainted with each other and learning something of the conditions under which the other fellows are working. And then remember that most of these young men have never known much about the railroads as a whole and have never stopped to think through the question of what the railroads mean to the country or community, and what great opportunities are open to a young man who is ambitious to succeed in railroad work.

The Service Ideal

Then, too, most of the boys never stop to think through the question of relationship with their fellows and the extent to which their own selfish interests are bound up in a larger program of service to others. Our pioneer forefathers had lots of room to expand in; many of them lived almost entirely independently of their fellows and made and raised everything that they used and ate. In this day we hardly do anything for ourselves. Our work is exceedingly highly specialized and we do only one, or at the most, a few things in this great, complicated industrial and commercial system, of which we as individuals form an insignificant part. The interests of each individual are absolutely interwoven with the good of the community as a whole and our own interests and those of the community depend on the extent to which we can engage in teamwork. If we can be led to understand the significance of this and to get the younger men to see it, then we will have gone a long way in getting them to recognize the ideals of service which should dominate their life work.

In order to promote these things, the talks and discussions were along the following general lines:

(1) Having a purpose in life and studying one's job. (Even some of the brightest and keenest of the young men had never really thought very much about the jobs they were working on. Somehow they had drifted into work on a railroad. They had never analyzed themselves to find out whether they matched up with the job or position which they were holding, or whether their talents could be utilized to better advantage on some other class of work.)

(2) Learning about the size of the transportation industry and what the nation owes to the railroads.

(3) Improved social relationships, particularly between boys and girls. (Possibly you are wondering whether this particular question has any place in a railroad conference. Is it not true, however, that the future of these boys and their value to the railroads and the community will be determined largely on how they face up to this question of relationships between the boys and the girls. I feel quite sure that if you had sat in in one of the little groups when they were discussing this question, you would have been surprised, and you would have a keener recognition of the fact that some of the boys are greatly in need of help in facing this problem.)

(4) Vocational guidance—advice by railroad officers as to how to succeed in the several branches of service chosen by the boys.

(5) Spiritual and inspirational talks and discussions to encourage looking upon problems in industry from the standpoint of the Golden Rule.

Vocational Guidance

Reverting for a moment to the fourth item—vocational guidance. Last Saturday morning each of the boys was given a form containing a list of about 100 typical occupations connected with railroad work. They were asked to check off that kind of work in which they were particularly interested; to state what occupation they would like to be engaged in in ten years from now; to tell whether they had had any experience which led them to feel that they had special ability for this kind of work and to state whether they were concerned about any particular vocational problem, present or future.

During Saturday afternoon, while our good president, Mr. Minnick, was engaged in conducting the young men through the Jones & Laughlin plant at Woodlawn, a group of us sorted out the forms and classified them in groups of young men who were interested in the same sort of thing. On Saturday evening a group of about 30 or more railroad officers from the various departments joined the young men. To each group of boys was assigned that railroad officer who could best advise with them about their work and preparation for the future. For instance, a railroad mechanical engineer was assigned to a small group of young men who expressed a desire to fit themselves for mechanical engineering. A group of young men who were interested in preparing themselves for operating positions was assigned to a general superintendent, and so on. A Y. M. C. A. secretary, who had expert knowledge of working with boys, was assigned to assist each of these railroad officers. The men gathered a half hour in advance of the dinner to discuss the program for the evening, after which they sat with their particular group of young men during the dinner. Before separating into groups to meet in various parts of the building, an address was made on the opportunities in the railroad field.

I must frankly admit that some of us who invited the railroad officers to help in this program of vocational guidance, were just a bit nervous as to how they would react to it and whether they would appreciate the opportunity of assisting the

boys. I was very deeply impressed as these men came from the group conferences and handed back the forms upon which they had made notes of their interviews with the young men, that each one thanked us heartily for the opportunity that he had had and shook our hands with more vigor and feeling than when he went into the conference. Indeed, a number of them went out of their way to express their appreciation for the privilege of being invited to take part in this part of the program.

Dignity of Railroad Work

At the close of the conference the young men adopted some findings. I shall not take your time to read these, but I particularly desire to call your attention to the seventh one on the list, which reads as follows: *"We appreciate the message given to us by the various speakers regarding the importance of the railroads to the country and the dignity of railroad employment. We recommend that the delegates go home with a determination to learn more and to tell others the facts about our industry."*

What would it not mean in building up and strengthening the morale of the railroads if all of our railroad officers and supervisors and workers could grasp the force of this particular finding --- *to recognize the dignity of railroad employment?* I am rather inclined to believe that if the conference had not done anything else it would have been well worth while from this standpoint alone.

Practical Value of Younger Men's Conferences

I have frequently been asked as to the practical value of these conferences. Indeed, a railroad officer in a small group asked me this question only a few days ago. Before I could answer, one of the operating officers present spoke up and said, "Wait a minute. I want to tell you of a boy in our office, who a year ago was very indifferent and careless; we almost despaired of doing anything with him. He went to the Younger Railroad Men's Conference at Detroit and came back a changed man. Because of the help and inspiration that he received he has gone into his work with real vigor, is making an effort to prepare himself for future promotion, and is having a helpful influence upon his fellows."

You may be interested in knowing that one of the closing sessions of the Pittsburgh conference was given over to group discussions by the young men on how they might best make the spirit and work of the conference effective in their lives and among their fellows back home

I wish there were time to go into some detail as to what followed the Detroit conference last year. Many of the boys went back home, and because of their changed attitude had a large influence on their fellows; indeed, there are not a few cases on record where the effect upon the local supervisors and officers was such as to cause them to take a much greater interest in the young men under their charge. A number of American Railway Employed Boys' Clubs were also organized. These clubs meet regularly, and frequently officers or foremen are invited in to speak to the boys and advise with them. These clubs, in addition to vocational problems, give attention to the social, athletic and spiritual needs of the members. In general it may be said that the standard program of these clubs, if properly promoted, may have a large influence in building character.

Training Employees

It is unfortunate that the railroads in this country have done so little to help in training the employes for better positions and for promotion. The English railroads have given far more attention to educational work, calling upon professional educators to work with the railroad officers in setting up courses, which are open to any of the employes who care to fit themselves for more important positions. That there is a large need for such programs in this country is indicated by a number of experiments, which have been inspired by the men themselves.

Too often the railroad officer is inclined to evade this responsibility by saying that the forces are scattered over great areas, but you know as well as I do, that there are many railroad centers where it would be possible to put on a real educational program. Indeed, it is going to be necessary to do this if we are to provide trained workers and the larger leadership which will be required in the future. Operating the railroads is becoming a more complicated and difficult problem and we must provide better men and a higher type of leadership for those who are to follow us, if they are to deal with these problems successfully and insure that adequate and reasonable priced transportation, on which the prosperity of the country is dependent.

The Leadership Question

Let us get down to brass tacks about this question of leadership. Industry has been slowly awakening during the past

few years to the fact that there is much useless friction and lost motion because the supervisory staff, from the top of the organization down to the foremen who come in intimate contact with the men, has not had adequate training in the art of leadership or the principles of successful foremanship. Men have been promoted to supervisory positions because they were good workmen. Several years were required to prepare themselves as skilled workers, whether in the shop or in the office, and then they have been placed in charge of men without having any special coaching or training as to how to lead the men, and yet it is coming to be recognized that industrial leadership is just as much of a science as medicine or any other profession. Somehow or other the railroads must get over to the supervisory staff the information and training which will help them to grasp the fundamental principles of successful management. Many railroad officers and foremen have been awakening to this situation. This fall, for instance, has witnessed quite a general movement among the railroads throughout the country in the setting up of foremen's clubs or classes, or of providing other means of training the supervisors in the art of leadership.

Then, too, I have found one place on one railroad where the local officer has in effect said, "Yes, we have been giving our foremen some sort of training in leadership, but how about preparing the men who are to succeed them in the days to come?" So just recently a class has been formed of the leading workmen and graduate apprentices who are studying to prepare themselves for promotion.

Tribute to George Basford

We can well afford to pay tribute this evening to the late George Basford, long a member and supporter of this club. Many of you realize that he gave much of his strength and life to inspiring railroad officers to give more attention to the necessity of properly training the boys and young men and of preparing both workers and officers for the larger problems of the future. I recall clearly when he returned from Europe in 1903 and started to prepare that remarkable paper which was later presented to the American Railway Master Mechanics' Association at its 1905 convention. It was this paper which formed the basis for the recommended practices for mechanical department apprenticeship, which were later adopted by the Master Mechanics' Association.

Few people realize how hard Mr. Basford worked in the preparation of this masterful address, which marked the begin-

ning of modern apprenticeship on railroads in this country, nor do they know that he got in touch with all of the leading railroaders at that time and had reactions and suggestions from such leaders as James G. Hill, E. H. Harriman and many others. Some of the railroads have endorsed the recommended practices which were adopted by the Master Mechanics' Association and after trying them for many years have become more and more convinced of their practical value, and yet the number of roads that have really done this is pitifully small.

I wish that every railroad chief executive and every mechanical department head could have sat as did with groups of the mechanical department apprentices gathered from all over the country in our Detroit Younger Railroad Men's Conference, and have heard what they thought of the kind of training that was being given to them on their roads. Some of them were apparently being allowed to "muddle through" a four-year period of training without any special direction. Little attention was being given to showing them how the job could best be done and no opportunity was given them of knowing why it was done in a particular way, or how the task upon which they were engaged, or the vocation for which they were preparing, was related to the operation of the railroad as a whole. In some cases boys are being held on certain machines or certain classes of work much longer than they should be, the overworked foremen not being able to take time to change them about and see that they are being given a square deal.

Is it not a blot upon the record of the mechanical departments of railroads in this country that the teachings of George Basford during the past quarter of a century have been so sadly neglected, although they have been found to give wonderful practical results where they have been given a fair trial, and this same thing applies equally as strongly to other departments as it does to the mechanical department. I trust you will pardon me for speaking quite so emphatically and frankly, but it seems to me that the time has passed when we can afford to "soft pedal" on matters of this kind. You will be interested in knowing that one of the findings of the Younger Railroad Men's Conference in Pittsburgh last week was, "We recommend that each delegate go back home and work for a higher standard of apprenticeship on his road."

I think I have said enough. If we are to face up to the great job ahead of us so that the railroads will make good under more difficult and complicated conditions in the years to

come, then it is absolutely up to us to do our full share in preparing the young men and the men who are to follow us, so that they can meet the demands that will be made upon them in the future. We need a better type of leadership and better trained and instructed workers. I thank you. (Applause.)

PRESIDENT MINNICK: Gentlemen, you have heard what I consider the best and most constructive address that has ever been delivered before this Club, that I have had the privilege of listening to. The Secretary put on a post card the statement that Mr. Wright was visionary. I will say that he has a real vision; he is talking about something that is of vital interest to every man in this room. There should be a very lively discussion. I am not going to call upon anybody in particular, at least for the moment, but I am sure that Mr. Wright would like to have what he has said to us tonight discussed, and don't believe that he will place a limit. Let's hear from you.

MR. GEORGE W. WILDIN: Mr. President, there does not seem to be very much competition to see who will open the discussion, so I will get what little I have to say on record now before some one steals all my thunder. I wish to endorse every word that Mr. Wright has said. I think the Club is most fortunate in being able to have Mr. Wright with us tonight and its members permitted to listen to the splendid paper he has given us. The question now is how to translate the ideas he has expressed into action. I believe one of the first things necessary in planning justice for the railroads is to have proper vision inherent in our National Government. I feel from the speech that the President of the United States made before the New York State Chamber of Commerce the other evening clearly sets forth his position in the case. His remarks concerning the Government's desire to let business alone so long as business took care of itself within proper limits is one of the most reassuring signs that the National Government is right at least at the present time, and from that source for the next three or four years assistance may be expected instead of the general attacks on railroads in the recent past. The railroads have been literally strangled in the past by governmental regulations, and as I have stated, the President's attitude as outlined in his speech is to be appreciated and should give the railroads encouragement to push onward with renewed vigor.

Now, Mr. Wright spoke of Senator Cummins of Iowa as having a change of heart and we all thank him for that, but

he has a co-worker from Iowa who ought to be representing the Russian Soviet Government, rather than the great state of Iowa in our National Legislature, and if somebody can propound some method of getting that individual righted, and a few others of the same type in that general territory, I think the railroads will get some help from that section of the country where they sorely need it. Senator Brookhart should not be in the Senate of the United States. He is a Bolshevist from the top of his head to the soles of his feet, and will never be anything else unless possibly the lesson he got a year ago in the election in Iowa may have a somewhat quieting effect upon him.

I think that is one thing we must look to in the future, and see that every one who lines up with that particular element gets the notion out of their heads that to lambaste the railroads is popular. It used to be so, but is not so any longer.

Now the question of educating the younger men is of vital importance, not only to railroads, but industry in general as well. If the railroads continue the pace they are going now and continue to plug along, they will get some place. There are a lot of good men at present in the railroad field, but they grow old and fall out of the service and they must have some one to follow them up.

I shall watch the Railway Educational Clubs with a good deal of pleasure, and I, for one, am thankful I have been privileged to be here tonight to listen to Mr. Wright's paper.

MR. E. EMERY: Mr. President, I enjoyed the talk, particularly from the standpoint of educating the young man on the railroad. I noticed an article in the paper the other day attributed to the Dean of the Scientific School at Yale, saying that the railroads did not want the college man in their service. I may not quote that exactly, but that was the impression I got, that they were not given the opportunities which their years of study and effort in perfecting their minds and education would warrant them in starting out in the railroad field, and I would like to get Mr. Wright's views on that from his experience with the railroad officials.

MR. WRIGHT: I have not yet had an opportunity of reading the Yale report. I do, however, understand what some of our educators think of the possibilities of college graduates upon the railroads. Not a few of them in the engineering departments feel that the railroads are practically sound asleep at

the switch concerning the possibilities of using college trained men. Representatives of some of the large industrial organizations, such as the Westinghouse Electric & Manufacturing Company, General Electric Company and American Telephone & Telegraph Company, visit the colleges months in advance of commencement to meet members of the senior classes and try to get them interested in taking positions with their companies. On the other hand, the railroads have done little, if anything, of this sort and the inference on the part of the college faculty and students is that the railroads are not interested in securing the services of college graduates.

I know of one effort which is being made to get a group of educators to sit around the table with a group of railway executives in order to discuss this question and see what, if anything, can be done; first, to get the railroads interested in using college trained men, and, second, in getting the colleges and universities to give more attention to the peculiar needs of the railroads.

We must not forget there is another class of potential railroaders being trained in our universities in the departments of business administration, such as the one at Harvard. I know of splendid young fellows who are taking this course, but it is almost impossible to get railroad officers interested in giving them a chance in the operating and transportation departments.

There are a number of university professors who are telling the graduates that there are good possibilities in the railroad field if they are willing to start in at the bottom and work up. There has been some considerable criticism because college trained men have been held down or held back by the question of seniority. My observation is that on the whole, if young college trained men are willing to enter railroad service and fight their way up, they will find that the effort is well worth while. We need only study the men who are now heading up our railroad organizations to recognize the fact that many college trained men have made good on the railroads in a large way.

Of course, if a man hasn't a good personality and brains, a college cannot supply these important characteristics. A college education does train a man to think, or it should do so. The railroads today need thinkers—men who will rise above the ruts and think things through on the basis of facts which have been accurately ascertained, and the railroads need men of vision who can look into the future and help to prepare for it. There are many college trained men who have gone into rail-

road service and worked hard, and who have succeeded in a big way. On the other hand, there are many men who have never had the advantage of a college training, but who have learned how to think and have worked to the very limit in preparing themselves for more important positions; these men have made good in just as large a way as have the college graduates.

Let us hope when we have found time to study the Yale report that it will challenge us to face up to this whole question of training men in a larger way. It is surely a tremendously big question. (Applause.)

PROFESSOR L. E. ENDSLEY: The educating of a young man has been a part of my job in the life I have so far lived, and none of you men in the railroad field or out of it are going to make a success without education, but you don't have to get it in college. But you have to get it some place, and you can't get it in eight hours a day, don't forget that. Nor you can't get it by watching the clock in the morning and watching it in the evening. That is one of the ways that educated men don't get their education.

Now, as far as the college man not going into the railroad field, there are two big reasons for that, and I think I am pretty well informed on this, because when I left Purdue University, eleven years ago, they had forty-four men taking the railroad course in Purdue University. They had eight this year. Now, the boys are not seeking it partly because of the agitation in this country against the railroads, and it don't seem to be the very honorable job that it should be, and partly because of the fact that the industrial world demands more, than the college can turn out today. Now, that is a fact that most of you don't know, but there isn't any college educated man who has the thinking power—I am not talking about a lot of them that shouldn't have gone to college in the first place—that have the thinking power that haven't a job today—I might say a position that most of them have.

This matter of the education of the young man is vital, and I can just appreciate how much Mr. Wright enjoyed those young men last week. Those of you who are working every day and have young men under you, get close enough to them to allow them to ask you questions. I know for a fact that a great many boys get discouraged in the job they are in because they don't understand one thing about and don't have anybody that they can go to to ask about.

MR. ARNOLD STUCKI: I hesitate to get up, because I cannot add anything to what has been said. As far as I am concerned, it is complete and it will take me about a week to study it up. I am deeply interested in the fact that the railroads don't get the credit due them. You heard Mr. Wright speak in the beginning of the differences in the development of the countries. He mentioned China, China with 400,000,000 inhabitants, China with natural wealth undeveloped, China with six thousand years ahead of us, and where are they today? I have seen trucks pulled by coolies, fifteen or twenty hitched to a truck by means of a rope, and about half a dozen pushing. I tell you, it nearly broke my heart.

Mr. Wright mentioned human slavery, that's what it is. You may ask, "How do those people live?" In the first place, let us see what money they make. These men, by working a full day's work, make six American cents in the ordinary, agricultural and commercial service. On railroads they make a little more. Now, you are going to ask me, "How on earth do those men live, and how do they support their families, their wives and children?" They don't live, they just exist. You can see them in Canton, for instance, huddled down by the thousands on these river boats. I shouldn't say boats, they are just abandoned hulls, good for nothing else; living there with their families and their domestic animals all together. I didn't see the inside of these boats, but I take it it is all one room. That is an instance of what a country comes to if it hasn't the help of railroads. I take the figures Mr. Wright mentioned as being correct, because they tally with what I have been told and what I saw.

Now, notice the contrast, and what comfort we have compared with any nation on the whole globe, and especially over China, mentioned by Mr. Wright. Is there any comparison as to method of living or as to comfort? We don't know what we have got until we see these other conditions. And why is this difference? Is it because we are an older country? It is just the reverse. It is because the railroads of this country helped to develop it. That is all I will say, Mr. President.

PRESIDENT: I don't want to take any part in the discussion, but there is a question comes to my mind, and I would like to get a little information. In the first place, our good friend, Mr. Wright, makes a plea for the young man, and he seems to foresee, as I get it, that on the shoulders of the young

man rests the future of the railroad; in other words, if he could be trained to do this thing, the rest of the railroad game is going to be comparatively easy, and I agree with him.

Professor Endsley raises a question as to the point of contact. Here is a young man who wants some advice, wants some information, and he goes to what Professor Endsley terms, "a would be foreman," and he does not get it. That must lead to discouragement. Now the thing that strikes me, and what I would like to get enlightenment on, if I could, would be, do you believe Mr. Wright, that it is better to force the issue with the young man as to what he wants to do when he is young in the game, or is it better to wait until he has worked long enough at railroading to somewhat get his bearings and perhaps determine for himself what he would like to do best, and then have what the professor suggests, a point of contact that he could go to to get help in the direction he wants to go? In other words, is it better to try to get the boy to determine early in the game what he wants to do or would it be better to wait a little while until he has determined for himself without any assistance or leading on the part of anyone on the outside?

MR. WRIGHT: That is rather a broad question. In the first place, I believe we have got to do a lot of weeding out at the very beginning, or when men are entering the service. There is no question but what railroads and industries today are hiring men for work for which they are not properly fitted. Personally, I believe that we ought to go into this question of recruiting in a more positive way. I believe that those who employ young men for railroad service should study to find the best young men in the community.

Some of you may know Superintendent C. H. Baltzell on the St. Louis-San Francisco. In talking with him a number of years ago, he said that he made it a point to keep in touch with the principles of high schools in the cities and towns along his division. In this way he was able to get a line on the promising young men, in order that he might induce them to enter the service of the Frisco.

Those in charge of the apprentice courses at some of the railroad shops are making a point of keeping in touch with the high school authorities in their district, in order to locate the best young men for apprenticeship and induce them to become apprentices. The same thing should be done to recruit the forces of any department on a railroad. After the boy is started he should be periodically checked up and coached. It is an ex-

pensive proposition to train a young man on a class of work for which he is not fitted and can never make good to any considerable extent. We have got to keep the square pegs from getting into the round holes. It seems to me that we can well afford to go even further into this question and periodically check up all of the men in the organization.

MR. HENRY F. GILG: Mr. President, my experience has been in line with the gentlemen who have expressed their thoughts and ideas, and I would suggest—I will make the suggestion later, but one of the things that came to me when I was a boy was what Mr. Wright expressed, the dignity of the railroad service. I wanted to get into it and I did get into it. That is what we must have now, is to raise the standard. Then the colleges will be filled with boys who want to get into the railroad service. As Mr. Wright said, as between General Electric and the Westinghouse and similar concerns, as against the railroads, the boys, if they were asked before they have had experience would say, "Well, I want to go to the Westinghouse in the air brake or the electric service or a branch, or something similar."

Now, I wrote a letter only yesterday morning to a young man in the railroad service in the southwest who asked me about going into the selling game. I told him that the railroads, are swinging back, the pendulum is swinging back to the railroad and they are coming into their own. Now, we can expedite that if we will all do what some cranks like myself have done, help the railroads. Some of you will remember my getting out the catch line "Quit nagging the railroads."

Now, I would suggest that the matter of education for these gentlemen to whom Mr. Wildin referred, such as we have in Iowa, Kansas, Minnesota, Wisconsin and other states, is to send a copy of the proceedings of this meeting to the congressman in our district, and every man interested in railroads write his congressman, "Did you read Mr. Wright's speech?" and get an answer from him.

MR. E. C. SATTLEY: Mr. President, it seems to me that this meeting has developed into a discussion, railroads versus universities. Now, take it as I see it, the universities are giving a great deal of attention of late years in particular to the development of athletics. They have their scouts out, they pick good football players, very well trained. They develop team work and the stars likewise develop, and they take care of them-

selves, they sure come to the front. I think the railroads can do a good deal the same way if they will show the same care in the selection of their employes, watch the development of the teamwork, and the men will find themselves and become stars and later on will be taken care of in the proper way.

MR. EMERY: Mr. President, I seem to have started something by that inquiry about the college attitude. My whole thought in that was that with a propaganda as started in that little simple newspaper statement on which I had had several comments made to me, such propaganda is influencing the minds of the younger mechanical men particularly as this statement dealt with the scientific school. Our speaker mentioned that Harvard has a business course, that again would affect the trend of thought of the college man.

A boy that is interested enough to go to college usually has something back of him. I am not holding any brief for college men, but I was just bringing out what Mr. Wright said as to this matter. He is taking the man as found in the shops and different departments, taking the material as found and taking them up. Now, a college man has gone through the fundamental stages of education and has developed, if he is going to develop at all, a process of thinking. Now, why can't or why don't the railroads encourage just as Mr. Sattley says, some of the stars that have been developed along certain lines in the business course, economics course and engineering course, to choose for their field, railroad work? They are beginning then with a trained mind interested in railroads, and they have got that much farther up the ladder in the gauge of mentality rather than devoting all their energy to making use of those men that have been found and are in the railroad service. Not that I am discouraging that feature at all, that field should be developed and there are lots of good men in railroad service that, as Mr. Wright brought out, just a little word of encouragement would also prevent them from getting discouraged. Get the man interested in the work or he cannot make a success in it, whether he shines shoes or is president of the railroad—I wouldn't say president of the railroad, but to a pretty high official capacity in a railroad, or any business. If his heart and soul is not in his work, he can't make a big success in it, therefore it strikes me that the railroads could help themselves a great deal in getting the trained minds if they would stop or counteract such propaganda as has developed from this one little statement.

MR. D. J. REDDING: Mr. Chairman, let me take just a minute of your time. I think I express the feeling of all the people here, that we have listened to a wonderful paper, one that perhaps we will know more about when we take time to read it over carefully, and particularly the discussion that has taken place, and I think we should not depart from here without expressing our appreciation by a rising vote of thanks to Mr. Wright. (The motion was seconded and carried by a rising vote.)

MR. WRIGHT: Just a word before we leave. In some ways I am sorry that this college question entered into the discussion, because it is somewhat aside from the thing that I wanted to get over to you this evening. While it is an important question for the railroads, my point is that after all, college or no college, the railroad managements have a tremendously big responsibility in training and preparing men and leaders for the future.

There being no further business, upon motion, adjourned.

J. D. CONWAY, Secretary.

In Memoriam

G. M. BASFORD,
Died October 26, 1925.

F. R. McFEATTERS,
Died October 27, 1925.

GEORGE A. POST,
Died October 31, 1925.

A. R. A. Standard Type "D" Couplers

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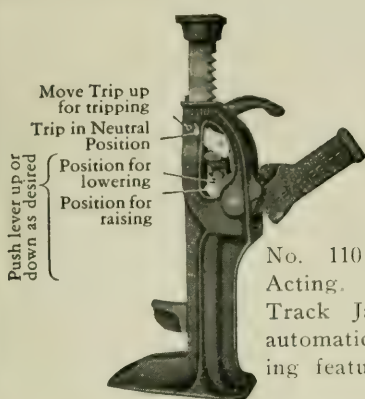
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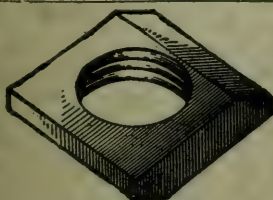
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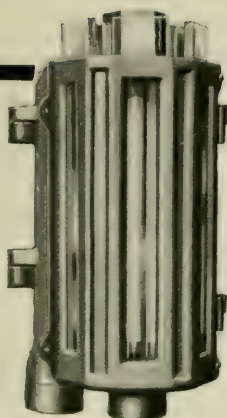
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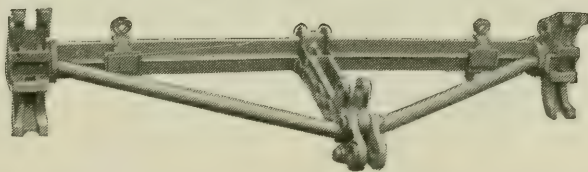
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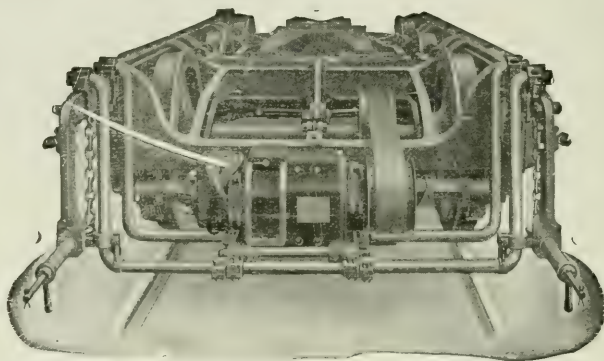
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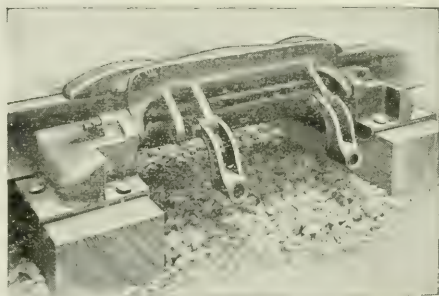


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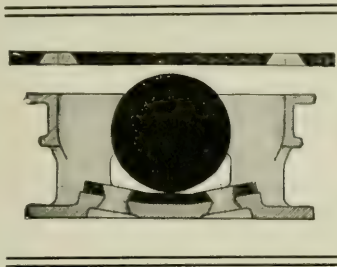
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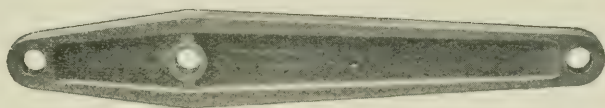
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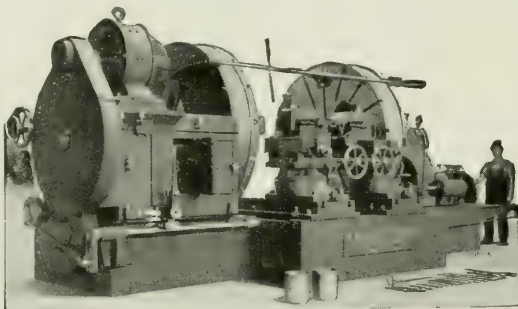
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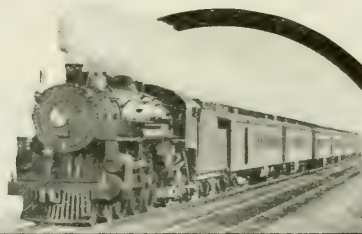
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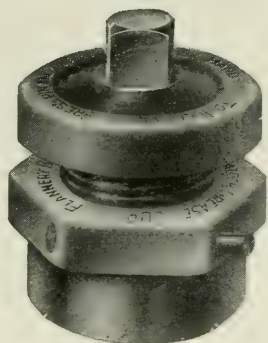
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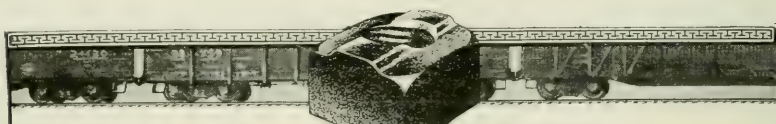
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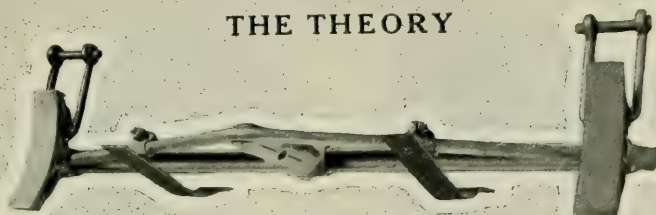
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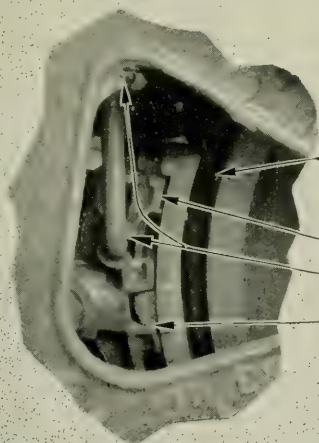




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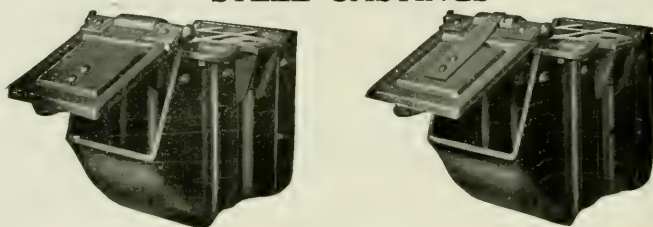


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HARRY B. KELLY, Gen. R. F. of E., P.&L.E.R.R., 821 Davis Ave., McKees, Rocks, Pa.
R. M. Long, Air Brake Insp. & Instr., P. & L. E. R. R., McKees Rocks, Pa.
COL. JAS. MILLIKEN, Pres., Pgh. Testing Laboratory, Stevenson & Locust Sts., Pgh., Pa.
J. T. CAMPBELL, Asst. Term. Agt., B. & O. R. R., Grant and Water Sts., Peh., Pa.
A. P. SCHRADER, Steam R. R. Sec., Trans. Div., W.E.&M.Co., C. of C. Bldg., Pgh., Pa.

Subject Committee

CHAS. ORCHARD, Spe. Agt., Traf. Dept., Carnegie Steel Co., Carnegie Bldg., Pgh., Pa.
JOHN B. WRIGHT, Asst. to V. P., Westinghouse A. B. Co., Wilmerding, Pa.
J. S. LANAHAH, Vice Pres., Ft. Pitt Mall. Iron Co., P. O. Box 1054, Pgh., Pa.

Reception Committee

F. H. FRESHWATER, Sales Agt., Pressed Steel Car Co., Farmers Bank Bldg., Pgh., Pa.
W. E. FOWLER, JR., Sales Rep., Graham Bolt & Nut Co., 3305 Shaffer Pl., Mt. Lebanon, Pa.
J. L. SMITH, S. M. P., P. & W. Va. Ry., Wabash Bldg., Pittsburgh, Pa.
E. EMERY, Railway Supplies, 417 Oliver Building, Pittsburgh, Pa.
M. A. Smith, Asst. S. M. P., P. & L. E. R. R., 720 Second St., Beaver, Pa.
COL. H. C. NUTT, Pres. & Genl Mgr., Monongahela Ry., Century Bldg., Pgh., Pa.
H. E. PASSMORE, Sales Mgr., Davis Brake Beam Co., 1602 Oliver Bldg., Pgh., Pa.
ROBERT ROGERS, JR., Sales Agt., Am. Car & Fdy. Co., Farmers Bank Bldg., Pgh., Pa.

Finance Committee

E. C. SATTLEY, V. P., Champion Sales Co., 604 C. of C. Bldg., Pittsburgh, Pa.
J. A. BEATTIE, Gen. Supt., Mck. Con. R. R., 1923 Frick Bldg., Pittsburgh, Pa.
C. O. DAMBACH, Gen. Supt., P. & W. Va. Ry., Wabash Bldg., Pittsburgh, Pa.
E. A. JOHNSON, Mgr. of Sales, Duff Mfg. Co., Preble Ave., N. S., Pgh., Pa.
E. J. SEARLES, Schaefer Equipment Co., 1827 Oliver Bldg., Pittsburgh, Pa.

Entertainment Committee

HENRY F. GILG, Salesman, Jos. T. Ryerson & Son, Inc., 1424 Orchlee St., N. S., Pgh., Pa.
JOS. H. KUMMER, Supt. Orders, Ft. Pitt Mall. Iron Co., P. O. Box 1054, Pgh., Pa.
S. E. VAN VRANKIN, Salesman, Loco. Stoker Co., 30 W. Gen. Robinson St., N.S., Pgh., Pa.

Past Presidents

*J. H. McCONNELL	October, 1901, to	October, 1903
L. H. TURNER	November, 1903, to	October, 1905
F. H. STARK	November, 1905, to	October, 1907
*H. W. WATTS	November, 1907, to	April, 1908
D. J. REDDING	November, 1908, to	October, 1910
*F. R. McFEATHERS	November, 1910, to	October, 1912
A. G. MITCHELL	November, 1912, to	October, 1914
*F. M. McNULTY	November, 1914, to	October, 1916
J. G. CODE	November, 1916, to	October, 1917
D. M. HOWE	November, 1917, to	October, 1918
J. A. SPIELMANN	November, 1918, to	October, 1919
H. H. MAXFIELD	November, 1919, to	October, 1920
FRANK J. LANAHAH	November, 1920, to	October, 1921
SAMUEL LYNN	November, 1921, to	October, 1922
D. F. CRAWFORD	November, 1922, to	October, 1923
GEORGE D. OGDEN	November, 1923, to	October, 1924
A. STUCKI	November, 1924, to	October, 1925

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

December 17th, 1925

The meeting was called to order at the Fort Pitt Hotel, Pittsburgh, Pa., at 8 o'clock P. M., President F. G. Minnick in the chair.

The following gentlemen registered:

MEMBERS

Allison, John
Altsman, W. H.
Anderson, A. E.
Anderson, G. S.
Babcock, F. H.
Baer, Harry L.
Bailey, Frank G.
Balzer, C. E.
Beltz, L. F.
Berg, Karl
Biggard, W. J.
Blakley, T. M.
Boiselle, Raymond
Buffington, W. P.
Burkhard, R. L.
Campbell, J. T.
Chase, C. N.
Cherry, J. T.
Clark, C. C.
Conlon, John F.
Conway, J. D.
Cooper, J. P.
Cooper, S. B.
Cotter, George L.
Coulter, A. F.
Courtney, H.
Crenner, J. A.
Cruikshank, J. C.
Dambach, C. O.
Davis, Charles S.
Depner, Michael
Durkin, James E.
Durkin, William L.
Emery, C. W.
Emery, E.
Farmer, C. C.
Fisher, John J.
Fults, J. H.
Furch, G. J.
Geddes, James R.

Gerard, F. R.
Gilg, Henry F.
Glenn, J. H.
Goda, P. H.
Greene, W. F.
Haas, J. W.
Hansen, Wm. C.
Harter, Arnold
Hinkling, F. G.
Hoffman, C. T.
Hogle, H. E., Jr.
Holmes, E. H.
Hood, J. M.
Hoover, J. W.
Hoover, R. C.
Howe, D. M.
Hyde, W. B.
Hykes, W. H.
Johnson, Nelson E.
Jungbluth, A.
Karns, C. A.
Kelly, H. B.
Kessler, H.
Ketterer, Fred P.
Klinefelter, F. A.
Knox, William J.
Kummer, Jos. H.
Landefeld, R.
Lingle, C. M.
Lobez, P. L.
Lohr, Allen W.
Long, R. M.
Lowry, Wm. F., Jr.
Mann, N. T.
Matchett, H. K.
Minnick, F. G.
Mitchell, W. J.
Mitchell, W. S.
Moore, D. O.
Morse, J. W.

Moyer, Oscar G. A.
 Muir, R. Y.
 McGeorge, D. W.
 McGirk, John D.
 McLaughlin, H. B.
 McMullen, Clark E.
 Obermeier, L. J.
 O'Connor, C. D.
 Orchard, Charles
 Osborne, L. E.
 O'Toole, J. L.
 Painter, Joseph
 Parke, F. H.
 Paul, Lesley C.
 Penn, William
 Perkins, H. E.
 Posteraro, S. F.
 Prince, Albert
 Prouty, E.
 Purnell, C. S.
 Ralston, J. A.
 Reardon, M. J.
 Redding, D. J.
 Redding, R. D.

Roberts, J. E.
 Ryan, William F.
 Saltic, Thomas
 Sattley, E. C.
 Schrader, A. P.
 Seiss, William C.
 Seley, C. A.
 Severn, A. B.
 Shellenbarger, H. M.
 Smith, Frederic M.
 Smith, M. A.
 Smith, R. W.
 Stamets, William K.
 Stewart, L. S.
 Stinemetz, W. R.
 Van Blarcom, W. C.
 Warrensford, Fred S.
 Weissert, W. J.
 Whitaker, U. A.
 White, C. M.
 Woodling, George V.
 Wright, John B.
 Wyke, J. W.
 Wynn, M. E.

Young, F. C.

VISITORS

Bardsley, H. E.
 Bjornson, Edwin
 Bollinger, P.
 Brooks, C. E.
 Candee, A. H.
 Collins, George
 Collins, G. C.
 Cusic, H. L.
 Daerr, N. K.
 Dean, W. E.
 Elsner, C. Rolf
 Feicht, R. S.
 Fenton, H. H.
 Gilbert, Oliver L.
 Gregory, W. H.
 Grove, L. T.
 Hedick, Peter
 Hill, H. H.
 Hunter, B. E.
 Inglis, J. G.
 Jex, W. A.
 Joyce, R. I.
 King, W. B.
 Lewis, S. B.

Marko, Paul
 Marthens, A. S.
 Moore, B. S.
 Moses, G. L.
 Mullenix, H. A.
 Murphy, T. H.
 McGee, P. A.
 McIntosh, R. L.
 McIver, A.
 McVicker, C. S.
 Ross, M. D.
 Rugg, W. S.
 Schrontz, S. B.
 Shean, Perry
 Shepard, F. H.
 Smith, H. K.
 Srolovich, Leonard
 Stanton, Charles B.
 Stote, J. K.
 Tidland, E.
 Urban, F.
 Wheeler, A. M.
 Wynne, F. E.
 Young, John

Zulaby, Elmer W.

The call of the Roll was dispensed with, the record of attendance being obtained through the registration cards.

The reading of the minutes of the last meeting was dispensed with, as they are to appear in printed form.

The Secretary read the following list of applications for membership:

Dodds, T. F., Salesman, Independent Pneumatic Tool Company, 718 Bessemer Building, Pittsburgh, Pa. Recommended by C. W. Leonard.

Fink, A. J., Asst. to General Manager, Pittsburgh Railways Company, 435 Sixth Avenue, Pittsburgh, Pa. Recommended by C. O. Dambach.

Fogel, Charles Z., Labor Foreman-Stores Department, P. & L. E. R. R., 436 Vermont Avenue, Rochester, Pa. Recommended by P. N. Sanfillip.

Gorby, Frank E., Superintendent, Union R. R., East Pittsburgh, Pa. Recommended by A. F. Coulter.

Gregory, Walter H., Machinist, P. & L. E. R. R., 1148 Church Avenue, McKees Rocks, Pa. Recommended by R. M. Long.

Holaday, William M., Mechanical Engineer, Westinghouse Air Brake Company, 353 Marguerite Avenue, Wilmerding, Pa. Recommended by N. T. Mann.

Hunter, Bernard E., Order Clerk, Westinghouse Air Brake Company, 353 Marguerite Avenue, Wilmerding, Pa. Recommended by N. T. Mann.

Hunter, F. M., Railroad Shop Section, Industrial Department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Recommended by A. P. Schrader.

Irons, L. O., Signal Material Supervisor, P. & L. E. R. R., Beaver Falls, Pa. Recommended by P. N. Sanfillip.

Jenkner, Oscar, General Yardmaster, Union R. R., 359 Larimer Avenue, Turtle Creek, Pa. Recommended by A. F. Coulter.

Livingston, J. Warner, Special Engineer, Westinghouse Air Brake Company, Tonnaleuka Club, Wilmerding, Pa. Recommended by N. T. Mann.

Martin, J. Howard, Vice President and Sales Manager, American Die & Forge Company, Box 21, Swissvale, Pa. Recommended by Henry F. Gilg.

- McIntosh, R. L., Vice President, Locomotive Finished Material Company, Railway Exchange Building, Chicago, Ill. Recommended by D. J. Redding.
- Sayre, Frank N., Trainmaster, Aliquippa & Southern R. R., 112 Orchard Street, Woodlawn, Pa. Recommended by C. D. O'Connor.
- Shirey, Don B., Train Master, Union R. R., 490 Marion Avenue, Forest Hills Borough, Wilkesburg Station, Pa. Recommended by A. F. Coulter.
- Spencer, Kenneth W., Draftsman, Union R. R., 7912 Riverview Avenue, Swissvale, Pa. Recommended by A. F. Coulter.
- Turner, Albert L., Lead Clerk, P. R. R. System, 334 School Street, Springdale, Pa. Recommended by T. M. Blakley.
- Wood, E. H., Salesman, Grip Nut Company, 5917 S. Western Avenue, Chicago, Ill. Recommended by E. A. Rauschart.
- Wright, O. L., Representative, A. O. Norton, Inc., 421 Chestnut Street, Philadelphia, Pa. Recommended by Samuel Lynn.

PRESIDENT MINNICK: These applications will be referred to the Executive Committee in due course, and upon approval by them, the gentlemen will become members without further action than the payment of the current year's dues.

If there is no further business we will proceed to the paper of the evening. I do not know of any one subject that would be of more vital interest to the members of the Railway Club of Pittsburgh than that of rail motor cars. It is something in which all railroad men are directly interested, and it is something in which the general public is directly interested. We have been most fortunate in securing for the speaker of the evening a gentleman who has had the opportunity to make a very thorough investigation of the advantages and disadvantages of rail motor cars, not only in this country, but abroad. I feel that we are going to hear something that will be of great interest to all of us. It affords me a great deal of pleasure to introduce to you Mr. C. E. Brooks, Chief of Motive Power, Canadian National Railways, Montreal, Canada.

RAIL MOTOR CARS

By Mr. C. E. BROOKS, Chief of Motive Power, Canadian National Railways, Montreal, Canada.

MR. C. E. BROOKS: Mr. President and Gentlemen: From the number of inquiries and accusations I have had to-day it would seem that I, as a Canadian, am blamed for bringing this summer (!) weather down here with me. I wish to assure you all that I have had nothing to do with it. As a matter of fact, when I got your very kind invitation to come down here, I had the idea that I was going to get away from that and get down here where the sun shone in December and possibly in January. But in talking with one of your old residents here, the elevator operator in the University Club, he told me that he had heard of the sun, but he hadn't yet seen it. I can assure you that I have had somewhat of a disillusionment and disappointment, for there seems to be some measure of truth in that old gentleman's remark.

I appreciate very much the kind words of introduction of your President. I can only say that the more I see and hear of this interesting subject of rail motor cars the less I feel that I know about it. It is one of those subjects which seem to be of international interest, but it is possibly of more vital interest to us in our part of the country than it is to you here, on account of the fact that we have to pay tribute to this part of the country, and to Uncle Sam in general, in that we have to import for our railroads from near this district some three millions of tons of coal per year. While it may not sound appetizing to you as railroad men engaged in the coal hauling business to hear that we intend to make every effort to reduce this tribute to Uncle Sam, I can assure you, gentlemen, that as railroad men ourselves, we intend to do just exactly what you would do, and that is, whether we are a government-owned railroad or not, we will operate just as cheaply as we can.

Before delving into this subject, I wish to express the appreciation of a Canadian, and as such really a foreigner, for the most kindly and considerate treatment which we receive on every occasion when we come across the line. The only exception to that which I can mention is the very careful scrutiny that Uncle Sam's inspectors made of us, particularly when they heard that we came from Montreal. However, they did not find anything.

In the endeavor to present to you the subject of rail

motor cars, the writer finds it extremely difficult to approach this perplexing question from any angle which will permit or promote new thought. Almost every club or association in any way connected with the transportation problem has reviewed this subject through the medium of club papers, many of such distinctly high quality and generous scope that there seems too little of the field remaining to cover. Perhaps, however, the very fact that so much is being said about this interesting subject is the clearest indication that the solutions offered to date are not entirely satisfactory and that there is even yet a feeling in well-informed railway circles, of great uncertainty about the entire future of this development.

Permit me, then, to enter into a discussion of the questions without covering in detail the entire development of the rail motor car up to the present time and to present to you the present situation as I see it.

It is generally known that a variety of reasons persuaded railway officers to experiment with rail motor cars, but the basic reason is the loss of earnings in local passenger and freight service to the public highways. The excellence of these thoroughfares in well-populated districts, built with the public's money; the well-advertised development of the truck and truck motor; the growing desire of the public to use the highway when, and where it wills, all combined with the ever-increasing pressure of restrictive railroad legislation, has forced the railways, in some cases, to abandon services maintained for many years and in other cases to make one final, great endeavor to retain a share of the business, by reducing the cost of the service—this is the present field for the rail motor car, but whether it will be the means of retaining the railways slipping grasp on local travel, is still an unsolved problem.

As an indication of the great differences of opinion, I would mention that an editorial in one of your daily papers recently stated that the railroads had nothing to fear from highway competition. If this opinion is correct, our rail car problem is settled now, for there can be very little, if any, need for them, but would the public fall in line with this argument and permit the railways to abandon all those short haul runs where highway competition has changed the question from: "How much profit can we make?" to "How little will we lose and still maintain a service?" The answer to this question is "No," and not only do we find ever-increasing opposition to reduction of non-lucrative service, but we now note with alarm

distinct evidence that there may be legislation shortly which will complicate and increase the cost of the only remaining means of meeting existing conditions without serious loss. It appears to the writer that strong, concerted action is necessary to enable un-restricted action to meet the conditions just outlined, and also to promote public consideration of equal control and taxation insofar as bus lines are concerned. In this move the influence and co-operation of the transportation employee must be felt if he is to retain a share of the employment due him.

At the present time there are as many different makes of rail cars as there are different floor plans of the cars in service. A quick analysis of conditions where rail cars replace steam trains indicates that the chief objections to the rail car is its lack of flexibility. Our local service in the past has been based on a locomotive hauling partly-filled passenger coaches, mail cars and baggage or express cars five days out of six with the definite knowledge that at any time and without any warning, even this capacity may be taxed to the utmost. Attempt to replace this kind of service with any existing type of rail car and we find that schedules cannot be maintained in all cases on account of inability to haul trailers. Design the car with the most careful consideration of the proper proportion of baggage space to passenger accommodation and we soon find a condition where we have practically two baggage cars separated by a passenger compartment, all of which causes much dissatisfaction and complaint. In the writer's opinion this condition cannot be met by a power plant of less than 300 B.H.P., and I say this with the full realization that when such a unit is in operation, traffic officers will surely discover that it would be much more valuable if the power plant were still much larger, all of which suggests to my mind that, where there is any considerable fluctuation in work handled by a steam train, a most careful economic study should be made, before there is any attempt to replace it with rail cars.

Before proceeding to any questions of design, let us first consider briefly the scope of this study under the following headings:

(1) Analysis of Carrying Capacity Necessary

Not only must the total number of passengers carried daily throughout the entire season be checked, but most especially must be determined, **the largest number carried at one time.**

Week-end and holiday travel must also be checked and a decision arrived at as to handling same, as we must recognize that a rail car unit to be economical, cannot be designed to meet any very great fluctuation of traffic. In addition, baggage, express and mail requirements must be carefully determined and provided for without expecting high-class passenger traffic to be satisfied with makeshift seating accommodation in express compartments. Bear in mind that our competitors on the highways find it difficult, if not impossible, to handle baggage, with the result that many attempts are made to move baggage on the railway while the owner travels on the highway. Express requirements particularly must be considered and provided for where necessary, by a power plant of sufficient capacity to haul a baggage and express trailer. In this connection the transfer of express at junction points is a matter often overlooked in preliminary investigation.

All of these considerations will enable a decision to be arrived at regarding the general design of the rail motor car, but whenever this study determines that the power plant must be ample to provide for a trailer the most difficult question to decide is the layout of the power car, and I suggest that unless an express or baggage car must be handled for transfer to another train, that the trailer should be the passenger car. In order to add to the flexibility of the equipment there may be something gained by providing window and partition design which, together with good, removable seats, will enable cheap conversion for handling passengers.

(2) Disposition of Equipment Replaced and Necessity for Providing Standby Equipment

In analyzing the economic necessity of substitution of rail motor cars for steam train equipment, claim is made by some that the value of replaced equipment (some of which may be used for standby protection) should be given consideration. The writer does not agree with this and submits that the only costs which should be taken into consideration are the actual operating costs and carrying charges as outlined in paragraph three.

(3) Comparison of Cost of Operation

The actual "out of pocket" cost of operation should be the basis for this study and generally this will include only the main items:

Fuel
Wages
Repairs and Supplies

The actual calculated saving will then be balanced against:

(a) the carrying charges of the new equipment,

(b) the depreciation of the new equipment,

and a decision arrived at as to whether change in service is warranted.

The Power Plant

Of equal importance to the general arrangement is the capacity and design of power plant.

Capacity

The power plant must provide in the main for resistance due to wind, starting, speed, grade and acceleration and in case the importance of any of these is overlooked, it may be well to point out just what they amount to, even if calculations referred to are quite elementary:

(1) Wind resistance

Considering a cross sectional area of 120 square feet and a speed of 50 m.p.h., without any head wind, the resistance is determined by the well-known formula:

$$\begin{aligned} R &= .002 V^2 A \\ &= .002 \times 50 \times 50 \times 120 \\ &= 600\# \end{aligned}$$

Horse power required to overcome:

Approximately 80.

Apply a transmission factor (electric) of 70% and this means 114 B.H.P. at the engine. (Gears 98%, Motors 80%, Generator 90%).

Add a head wind of 20 m.p.h. and the B.H.P. required becomes approximately 225.

(2) Starting and Speed Resistance

It is almost impossible to compute resistance at the actual moment of starting, as it varies all the way from 10# to 55# per ton for plain bearings, depending on the temperature of the journal and nature of lubricant, but, combined with low-speed resistance, it is of sufficient import to warrant roller bearings where very cold weather is experienced.

Considering a car weighing 100,000# and a speed of 50 m.p.h.—B.H P. required—approximately 65.

(3) Grade resistance being a variable factor, depending altogether on the profile and being so thoroughly understood, we will omit any reference to it other than stating that at 30 m.p.h. on a 1% grade, B.H.P., required for 100,000# car is approximately 114 for **grade only**.

(4) Acceleration

Taking locomotive builders' data as a basis and assuming that a force of 95.6# is required to produce an acceleration of 1 mile per hour per second per ton, we find that to maintain this acceleration at 10 miles per hour with a car weighing 100,000#, we use approximately 190 B.H.P. This power requirement increases proportionately to the speed, meaning that with a limited power plant the acceleration curve must fall off rapidly as wind and speed resistance increase.

In summarizing we find that the 100,000# car requires 180 B.H.P. for wind and speed resistance at 50 m.p.h. and that if high acceleration is to be had, we must have a power plant of at least 250 B.H.P. If a 60,000# trailer is to be hauled at overall schedule speeds of between 25 and 30 m.p.h., the plant should be at least 350 B.H.P.

Before leaving this part of the discussion, let me suggest that as engines which are economical in fuel consumption are developed, the range of use of the motor car will increase and there is no good reason why a power car of 500 or even 600 B.H.P., may not be used for many purposes. Powers up to this size may, of course, be transmitted by hydraulic or mechanical means, but a survey of present developments indicates a great preference for electric transmission of power, with the entire generating unit above the deck of the car.

Fuel: Mention should be made of the fuel to be used. Today practically all power units are gasoline, for the reason that gasoline is the popular power fuel in America, owing to its general use and adaptability, even to engines of indifferent design and poor maintenance condition. The best figure we may expect from any gasoline engine is .6# fuel per B.H.P. hour for constant operation and .7# for variable speed.

Considering that the specific gravity of gasoline is .71 and of the lightest fuel oil is .86, and that the relative prices are about four to one, and knowing that an efficient oil engine will develop power for less than .45# fuel per B.H.P. hour, we must conclude that the gasoline car will cost approximately six times as much for fuel. For a car of 100,000# weight on

an average branch line schedule, this difference will be from 6 to 10 cents per mile, or considering a car making 60,000 miles per year, it will amount to from \$3,600 to \$6,000 per year. This capitalized will much more than pay for the more expensive power plant which we will assume the oil engine to be at this stage of development, before standardization and production has any marked effect on heavy initial costs. While it is not to be expected that the oil engine can be produced for the same cost as the gasoline engine under any production conditions, still it is safe to assume that with any interest shown in it by American Railroads, the price per B.H.P. will be such as to be most attractive.

Comparing the latest designs of these engines as they stand today, we find:

Weight per B.H.P. (12-15#)	equal
Piston Speeds (1200-1500 f.p.m.)		

First Cost.

Oil engine three times gasoline engine for same power.

Fuel Costs.

Oil engine from 1/4 to 1/6 cost of gasoline engine.

Starting.

Oil engine started in same time but requires greater battery capacity.

Speed Control.

Little difference—but gasoline engine will idle at lower speeds.

Noise, Smoke and Vibration.

Less for the gasoline engine but no reason why these conditions cannot be reduced to the point where they will not be objectionable. No carbon monoxide with oil engine.

Fire Risk.

In favor of the oil engine.

Reliability and maintenance to be determined in case of light weight oil engines but no reason to believe that subsequent to test periods, there will be any marked difference.

In the foregoing, reference is made to fuel oils of .86 or approximately 32° Baume gravity, but there is no reason that fuel oils of 26° Baume will not be used just as successfully and at lower power costs. The real basic strength of the principle

behind the oil engine is the use of residual oils—leaving the high volatile oils for the automobile, truck and bus trade.

Double End Control.

Much has been spent not only on double end control, but also on multiple unit control of railroad motor cars with self contained power plants. There are so few conditions, which make multiple unit control necessary that this expense may well be dispensed with. The same argument applies to double end control, a feature which introduces difficulties and expense in the following ways:

Duplicate controllers and circuits.

Transmission of mechanical throttle control with great possibility of lost motion.

Difficulty of providing for operator at end away from power plant, without complicating car construction and heating plant.

Objection to having operator away from power plant.

Objection to any passenger passing through power section of car when hauling a trailer.

I submit that in most cases, single end operation will be satisfactory.

Before concluding, permit me to refer to two supposedly minor points which, however, have much to do with the comfort of the passengers.

Spring Gear.

The principle, or rather lack of principle, behind railroad spring gear practice will not suffice for light car operation, particularly where the power plant has any heavy torsional reaction. Present designs of trucks and equalizer springs simply increase such vibrations and pas them back into the center ills and from there to the car body. Study is necessary to develop equalizer springs which will dampen vibration instead of synchronizing with it. At the same time, the greatest possible length of bolster springs should be used.

Seating:

If we are to consider the railroad motor car as competing with the highway bus, there must be a great improvement in the design of the seats to give more comfort. Practically all designs aim at the greatest seating capacity in the smallest space, but this idea should not be overdone.

In conclusion, I submit that, while many difficulties have

been experienced in railroad motor car construction and development, that distinct progress has been made and that the motor car is here to stay.

The extent of the field for use has not yet been determined but everything points to this field extending just as rapidly as the power and utility of the motor car designs warrant, and as this extension is realized, not only should the public and the railroad corporations benefit, but the employe should also benefit materially by retaining, in many cases, what is being lost to the highway.

PRESIDENT MINNICK: Before starting the discussion of this most interesting paper, our genial friend, Mr. Brooks, spoke twice of the fact that the sun failed to shine in Pittsburgh and I would like to ask him how he could expect to have it shine when he speaks in the next breath about taking away the hauling of Grand Trunk R. R. fuel coal.

To me the subject, which he has discussed so ably is of vital interest. I know that it is of great interest to many of you. I hope we may have an earnest and even lengthy discussion, and I am sure Mr. Brooks is fully competent to answer any questions you may wish to ask on points that may not be clear to you because of your limited experience with the rail motor car.

MR. A. E. ANDERSON: To act more as a gas engine, because that is in line with my business, rather than an oil engine which takes a longer time to start, I will make an effort to refer to some matters which I have observed in connection with the subject of the evening, which is really the most important development in transportation lines we are now experiencing. But it seems to me that raising the question of the passenger traffic the railroads are losing to the motor cars is a somewhat shortsighted view, just as in the early stages of the railroads there were short sighted views as to what railroads were going to accomplish. When we realize, as we have in the past summer in the midst of the depression, which we had for eighteen weeks continuously, each week more than one million car loadings, when you figure, that from this district, which is the heaviest tonnage producing district in the world, not even excluding New York harbor, with the coal business practically dead, yet the railroad business has grown to such magnitude that it has made a record which has not been exceeded at any time in the past, it would seem that the motor truck is not in-

terfering with the traffic to any great extent. The complaint seems to be that on certain branch lines of the railroads where there are parallel highways which furnish a free right of way, it takes away a great deal of passenger traffic and therefore railroad lines must be discarded and railway service done away with. This country is growing at a rate that we do not appreciate, and it seems to me the great fault with those complaints is that they should get busy and build up the traffic for the railroads as well as traffic for the motor cars and keep both lines of transportation in existence, for they will both be needed. There is a line in the west of some 300 miles that they were talking of abandoning because it did not pay. On that line there would be a destruction of values running into millions upon millions of dollars is established industries. And yet in the discussion I did not see any movement on the part of these communities to help to build up to meet the loss that was taken away by the motor traffic people. That is one element of the motor operation question as we have it to consider. We have about 17,000,000 cars in operation in the United States and they are taking a great deal away from the railroads and street cars. Yet my observation is that the trains are still crowded more than to capacity, even from Roup Station which is one of the most closely competing points in the suburban traffic of the Pennsylvania Railroad. The railroads are crowded, the boulevards are crowded, yet the city is growing at a rate that will support all these three lines.

The speaker referred to the question of flexibility in operation of railroad trains as compared with motor cars. That is one of the things I would like him to speak of further, because during our street car strikes, within an hour almost the railroads had their equipment transferred and put in service, surplus equipment that was used in different lines. How is the motor car going to meet the demand of such an issue in small units? When you take the cost of motor operation on the community as compared with railroad operation, I have often thought of that in line with a friend of mine who said he could only afford to operate for his own use the most expensive automobile he could get. He has a chauffeur and a family, a couple of sons and daughters. He comes to town in the car and it goes back home, the family use it through the day and the sons in the evening. That takes away a certain amount of traffic from the street cars and railroads, yet it adds an enormous excess to the maintenance expense of that man and his

family, which he passes along to the community. I would like to ask whether the maintenance of the motor car and the use of automobiles in competition has ever gone into the question of the general effect as to the increase of cost to the community by the operation of automobiles in that manner? When you consider a man of that kind, you can multiply results in the United States by 10,000,000 families, leading into an interesting cost field.

The paper is well worthy of discussion by the railroad men that know about the subject. It is of particular interest to Pittsburgh because of the discussion of our subway transportation and whether motor cars with either gasoline or oil can be developed for use as against electric power raises a question in which we are all interested.

PRESIDENT: Mr. C. A. Seley, consulting engineer of the Locomotive Firebox Company of Chicago is present tonight and we would like to hear from him.

MR. C. A. SELEY: I do not see why I should be called on to speak, having been out of the railway service so long. It is true that the road with which I was connected some years ago did some experimenting in the use of rail motor cars but that experience has little present value.

There is one particular phase which has struck me in this case, differing from the general practice of railroads; and that is, instead of a manufacturer going to the expense of working for a number of years in developing a lot of red figures in the trials and perfecting of his device, before its acceptance by the railroads as customers, here is a railroad that starts out to assume the development of the matter itself. It looks from the paper that was presented as though it had been put into very competent hands.

I do not know very much about the detail of the power plant that has been referred to, but the statements of operation, fuel, costs, etc., are very interesting indeed. It was my impression that the Diesel type of power necessitated accommodation of very heavy weight. Apparently on the cars which have been experimented with on the Canadian National this objection has been removed. Regret that I do not feel competent to go into the merits of the case further.

MR. W. K. STAMETS: Brief reference was made to hydraulic transmission. What experiments have been made along that line?

MR. C. E. BROOKS: I have not had any real experience with hydraulic transmission. I have seen a small Lenz gear in operation and I have seen the hydraulic gear referred to in the first gasoline hydraulic locomotive that was made in this country, I think, the same gear being developed and in use lately to a certain extent on the New Haven. I am sorry to say that I can not tell you just how satisfactory this gear is. Just whether or not they are going to go farther with that is more than I can say, but I believe that the last New Haven equipment has been gas-electric, made right here. Possibly some of you can give us some real information on that.

The general basic objection there has been to hydraulic transmission—and I apologize for not knowing more about it, for there is a hydraulic transmission that has been developed I think by Mr. Sperry, which is supposed to be a splendid mechanical article, but which I think is entirely in the experimental stage as yet—but the general basic objections that have been raised with regard to hydraulic transmission are the steadily decreasing efficiency due to the wearing of the parts which go to make up the hydraulic transmission even though immersed in oil, and also under certain load conditions the fact that there is a distinct drop in efficiency due to the emulsifying of the liquid. Whether or not these objections can be entirely overcome I do not know, but I do know that the Lenz gear in design has attempted to overcome the latter by the shaping of the parts and runways for the fluids so there is the least possible agitation. That is about all I can tell you about the hydraulic transmission.

MR. N. W. STORER: I have been intensely interested in the paper tonight. The author is one of the few men in the country who can speak authoritatively in regard to this subject. I am particularly interested in the depth of his information in regard to the amount of power which is required to move this car. It certainly takes a larger amount of energy to operate the car at the high speed than it is ordinarily accredited with by the steam railroad man. However I am hoping and believing that we can improve the efficiency of transmission from the engine to the rail. 75% looks a little too low an efficiency for electric transmission, although we have two transformations to make, first from the engine through the generator and then from the generator through the motor to the rail. Under favorable conditions we can probably reach to as high as 80%, and I think we should get 75% under most all conditions with a car

of ordinary dimensions. I would like to get more information in regard to the amount of power required for starting. What is the speed to which the engine must be brought up before it will ignite? You speak of the idling speed. How much power is actually required to bring a 300 h.p. engine to that point? How much torque, speaking in terms of the normal load torque, would be required to turn it over, bringing it up to such a speed? It must either have a considerable amount of power to put it over or it must be a rather small torque. If it is a matter of 3 or 4 or 5" to bring it up to that speed. It is a very interesting point.

I have been looking into the oil-electric and gas-electric cars a very little lately and it seems to me almost every car has a different scheme for control, and yet they are all working to a greater or less successful degree. I think the most of them are getting fairly satisfactory results. And I believe from the electric standpoint we can assure Mr. Brooks that the control will be very satisfactory, both for single car operation and for multiple unit operation, if there is any demand for multiple unit. It does not seem to me that there is any difficulty whatever from the electrical standpoint. There may be from the oil engine. We will have to find out from a little further experience.

MR. C. E. BROOKS: Here is an 8-cylinder engine, 8¼ by 12, using light fuel oil. I would like to have more information for you and will have this winter, for we are going to take a four cylinder engine in the months of January and February and apply to it all the ordinary trade brands of fuel oil, between 24 and 32° Baume, and we are also going to apply to the machine the various kinds of lubricating oil, and we will be able to tell you after going through with this—and if it is of interest to engineering people in general we will be very glad to publish the reports of these tests so that anyone will know just what to expect from this type of engine. You realize, of course, that the viscosity of the lubricating oil, the temperature at the engine and the amount of volatile in the fuel oil are all very important factors in the starting of the fuel oil engine. You will understand that in the first kick of that oil engine you have amperage going up pretty high. Mr. Fenton was rather alarmed when he saw the swing of the ammeter. But that is so momentary that it is almost impossible to measure. Our maximum swing in this 8 cylinder engine was 480 amperes and 150 volts, 96 h.p., 72 k.w. The current falls so rapidly that it is hard to get the volts corresponding to the maximum amper-

age. 96 h.p instantaneous only and falls rapidly to 230 amperes and 150 volts, 46 h.p. As far as the speed at which you get ignition is concerned, about the lowest speed we can figure on regularly on that class of engine with the fuel oil we are using is somewhere about 100 revolutions. We start these engines without taking the compression off them. When we started the experiment with them in the first place we used to take the compression off the engine and spin it, throw the compression on, and the first compression stroke that was made, was really the first kick of the oil engine. We do not bother with that at all now. The operator pushes the control over to the operating position and the engine starts against compression. The minimum revolutions that I would say with this class of oil engine that it is safe to idle, and know you are going to have ignition is somewhere around 150 revolutions. It will vary, depending on the number and condition of the cylinders, somewhere from 150 to 200. The ignition temperatures are obtained at a lower point than this in reality, but idling with no load the atomization of the oil in the multiplicity of cylinders is so minute and through such a short period for the atomization part of the cycle in each cylinder that you are bound to have at these low speeds rather irregular firing. With the real Diesel engine I think that where your atomization is obtained by your high pressure air charge forcing the oil charge in, you would possibly get a little more regular firing at those idling speeds than you would with the solid injection engine.

MR. C. M. WHITE: This may be a little irrelevant, but I would like to ask Mr. Brooks if he has run any dynamometer card tests comparing Diesel engines with a modern high pressure steam locomotive and what his results were relative to a basic price of fuel oil at 5c or 6c per gallon, what price per ton of coal would you have to get to keep that price of fuel oil?

MR. C. E. BROOKS: Now you are getting pretty close to the fundamentals of this. There isn't any question but that this question you have asked now is going to be the determining factor as to whether the steam locomotive will do our work in the future or the oil burning locomotive; you say with oil at 5 or 6c a gallon. First of all I do not think that is the correct figure. Considering the United States gallon, I think the present day prices for 26° to 28° Baume oil at the refinery in this country are at a much lower figure than that.

MR. WHITE: That is in Pittsburgh.

MR. C. E. BROOKS: I can not tell you as much about Pittsburgh as you should know. I will say this: Let us get down to the theoretical part of this thing, and I believe this is well substantiated by performance. Take the average operating conditions of the steam locomotive in road service—I am not taking into this consideration the steam locomotives where stand-by losses are high, but the steam locomotives such as operate on one of the low grade lines. You will not get much over 6 per cent thermal efficiency over all. You certainly can expect to get from oil-electric a thermal efficiency over all of between 21 and 26 per cent, averaging around 24 per cent, which is a straight ratio on thermal efficiency of 1 to 4. Knowing the price of oil, and knowing the price of your coal delivered, I think it is a straight engineering problem to put the two on a relative basis. But you have got to go somewhat farther than this. Our problem for instance is this. We have to buy coal for which we have to pay foreign lines, like yours, Mr. President, to haul to us. We know that our average fuel is about 12000 B.t.u per pound for coal. We know that the average heat value of oil is 18000 B.t.u., or a relation of 1 to $1\frac{1}{2}$ in heat value per pound. We know further that with the relative thermal efficiency which I have just given you, the final relation, considering the thermal values and also the actual heat values, is a relation of about 1 to 6, which means with us that where we have to haul 6 lbs. of coal and deliver it along a 23000 mile railroad scattered over half a continent, that we will be able to do the same amount of work with 1 lb. of oil. We think that is going to be the great determining factor in our future fuel costs.

MR. C. O. DAMBACH: I was very much interested in the paper, and if the information can be furnished without any embarrassment to the speaker it might be interesting to have further enlightenment on the question of costs.

We have made some experiments with the gasoline car, but our investigation did not develop that peak loads could be handled as economically as with a steam engine. We, of course, have the benefit of cheap fuel and do not anticipate any trouble in getting better coal than mentioned by the speaker.

For the purpose of comparison it would be interesting to know the direct cost of operating an oil electric engine with trailer on about a 1 per cent grade, figuring on a mileage of about 200 miles per day, i. e., the wages of crew, repairs, sup-

plies and fuel, eliminating for the purpose of comparison the charges for depreciation and track maintenance.

MR. C. E. BROOKS: We are again getting pretty close to fundamentals when you ask a railroad officer to give out his costs. It is not my privilege to give out very much about cost for publication. Furthermore, I am satisfied, and I think you would be, that you are not going to get low fuel cost when you are in an entirely experimental stage, with untrained operators and lack of experience generally, but I have got cost figures and I know that we can operate a car weighing 188,000 lbs. with a trailer over a 330 mile a day run for a fuel cost of approximately 3c per mile in Canada, and our fuel costs are very much higher than yours. That is fuel cost alone, there is no labor cost in that. I do not know what it is going to work out at in the long run, because I can not tell any more yet than you can tell me what the maintenance costs will be. I think they are going to be reasonable, after we get some of the kinks that we are up against ironed out.

You speak about 14,000 B.t.u. coal. I will agree there is a lot of 14,000 B.t.u. coal and it is just the same old story that the mechanical department is expected to perform 365 days in the year as if there were 14,000 B.t.u. coal on the tenders, which there is not and never will be. You have 14,000 B.t.u. coal in eastern Kentucky and West Virginia and southwestern Pennsylvania when it is purchased. Perhaps you get the best of it, but by the time it gets up to us and on our stock piles and has snow mixed with it and sand and rubbish of one kind or another, and when it finally gets on to the tender and into the firebox we have an average over our entire railroad of about 12,000 B.t.u.

MR. D. J. REDDING: I want to say for Mr. Brooks' information that right here in the Pittsburgh district we do not get the best of coal, for while it is produced in this section, under present conditions, there is only a limited quantity being mined and practically all of that is being shipped away to points outside of Pittsburgh, while the roads in this district are using the poorer grades. That is, of course, neither here nor there on the question of the efficiency of the oil engine. But what concerns us a lot, and everybody else who has considered the introduction of rail motor cars in competition with small steam trains for branch line service, is that most of the railroads have equipment on their books at depreciated values

which they can use in branch line service, and generally speaking, even if you do have a baggage car and smoker, coach and locomotive, you can make your first installation at a lower cost than you can a rail motor car and trailer. You may save a man in the crew with the motor car in some cases, but if you are going to operate it on a busy piece of track mixed in with freight, passenger and switch engines, you will need practically practically the same number of men in the crew to take care of your flagging and handling of passengers. Some figures we have accumulated would indicate that you might make a saving in operating expense of 15 to 20 per cent, but when you figure that you have to start out with a light initial investment to operate a rail motor car and trailer, as compared with the use of your old equipment, you are going to hesitate.

I wonder what kind of figures Mr. Brooks has been able to obtain as to the operation of a small steam train and the kind of equipment generally used on it and a new rail motor car and trailer?

MR. C. E. BROOKS: This information, which you ask for, is just a little bit hard to get. First of all, you are speaking about the depreciated value of existing equipment. I maintain that the value of the existing equipment has nothing to do with the question whatever. If you have to invest \$50,000 for a rail motor car and if you can show an actual "out of pocket" saving of fuel, supplies and wages, equal to the carrying charges of that \$50,000, and anything as a profit at all, you are justified in purchasing that rail motor car regardless of how much of this idle equipment you have. I do not really see what the value of the existing equipment has to do with it at all if you can make money by spending additional capital. Regarding the cost per mile of these cars, which will seat 55 to 60 people and have a liberal baggage space, weighing up to 100,000 lbs., we can run such cars with gasoline for something around 27 to 32c per train mile or per car mile, and we can run the oil car of corresponding weight, as I tried to explain, for from 6 to 10c a mile cheaper than that. What the cost of your operation of a light steam train will be depends on what you have to pay for fuel. That is one of the fundamental factors. But where you are paying, as your trunk lines far removed from the coal districts are and as we are, a figure of practically \$5.00 a ton on the tender without your own haulage, and assuming as about the best unit figure a coal consumption

of about 14 lbs. of coal per passenger car mile, you can figure out what your steam train operation is going to cost per mile for fuel. I think as an average it would be safe to say that with our fuel costs, on the basis I have given, we are running about 20 or 21c for fuel for that branch line train mile. Compare this with a very much smaller and lighter unit, a unit which is unable to meet the peak loads of which I spoke, but which will carry on for $\frac{7}{8}$ of the time, using oil costing about 2 to 3c per mile.

MR. N. W. STORER: I just want to say that Mr. Shepard, Director of Heavy Traction of the Westinghouse Company, is here and if he were urged sufficiently I believe he would say something.

PRESIDENT: We would be very glad to hear from Mr. Shepard.

MR. F. H. SHEPARD: I think the Railway Club of Pittsburgh is to be congratulated upon having as their speaker a man who has given such an illuminating talk on a subject which is in the mind of every railroad man. There is scarcely any one in the mechanical or operating departments that is not energetic at the present time over any way or any method of improving the efficiency of rail operation. It was predicted that in the fall of 1925 with the increase of business, which was in prospect, industry would be handicapped by embargoes over the country because the facilities of the railroad could not meet the demand. The railroad staff throughout the country have not been laggards by any means. The mechanical departments of our railroads have responded in such measure that, with the largest freight business ever experienced in the history of the country, exceeding a million cars a week for many weeks, and even for the first week in December there has been available a continued surplus of cars and with many engines white-leaded. This spells efficiency. We think of ourselves as Americans. We are on one side of the line; on the other side is Canada; we all think Canadians and Americans are of much the same stuff. All of us are glad to welcome Mr. Brooks as one of the best type and most representative and advanced of American railroad men, and in recourse to such we can all take assurance as members of the Railway Club of Pittsburgh that the efficiency of our rail system is the one thing that is going to maintain the element of efficiency to assure success in all in-

dustry on this side of the water, the United States and Canada.

MR. D. J. REDDING: As there seems to be a shortage of speakers and no one else seems to want to question Mr. Brooks further, I feel that we should join in a vote of thanks to him for his very able talk tonight. We have all appreciated the wonderful things he has told us and the fact that his talk represents a tremendous amount of study and thought on his part, and he has treated us very kindly in coming here to this sunless city to entertain and instruct us. I would move a vote of thanks and suggest that we make it a rising vote, in appreciation of his wonderful address.

The motion for a vote of thanks was adopted by unanimous, rising vote.

Upon motion adjourned.

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* The above is an extract from the item appearing in the Canadian National Railways Magazine of December, 1925.—Ed.

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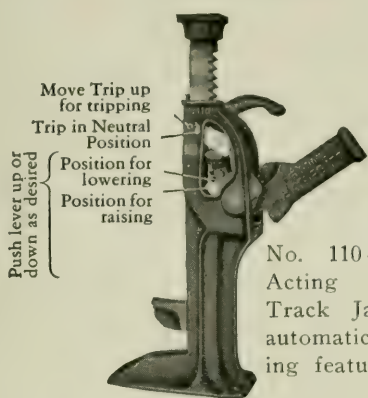
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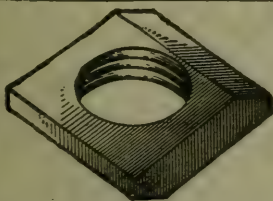
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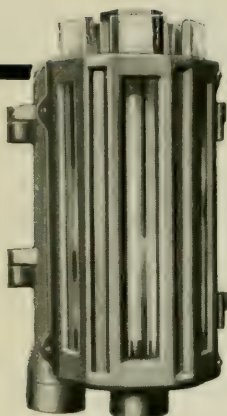
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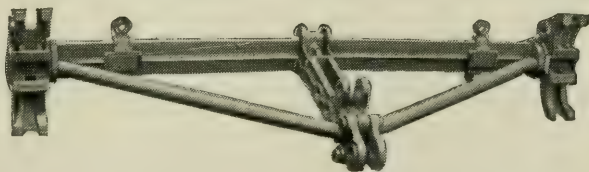
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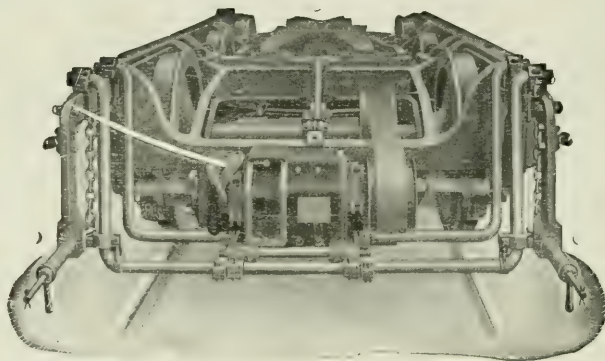
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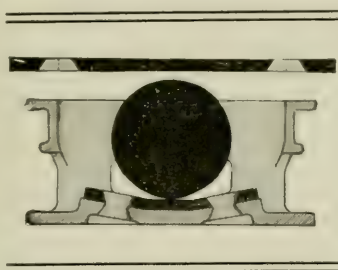
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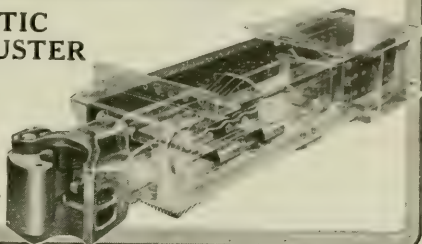
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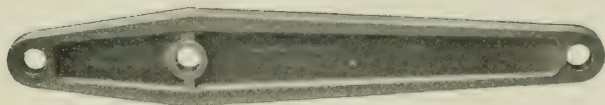
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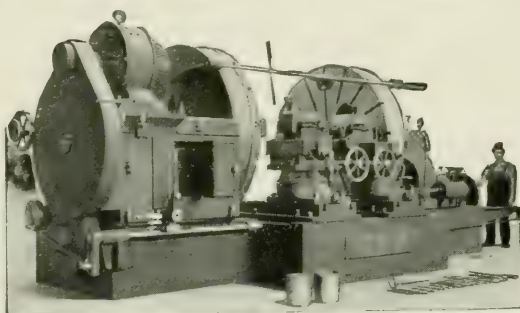
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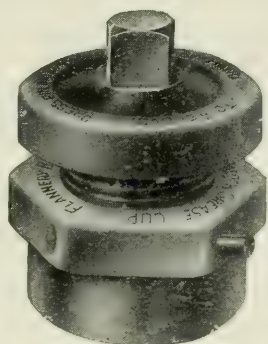
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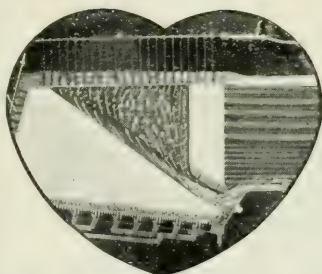
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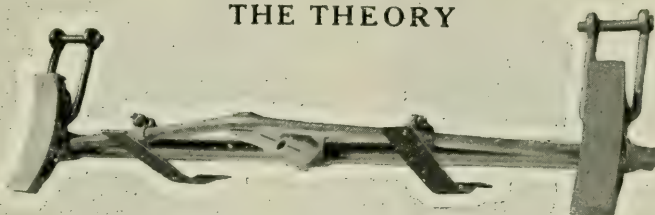
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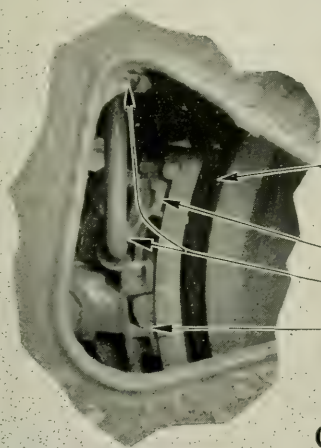




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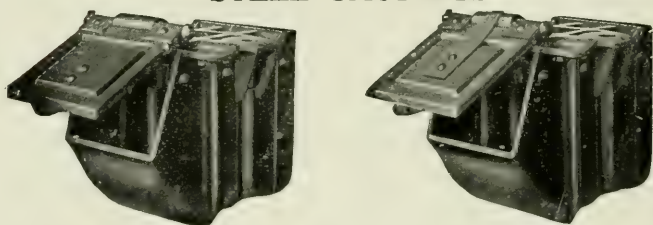


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No. 3

Pittsburgh, Pa., January 28, 1926.

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A. STUCKI.....November, 1924, to October, 1925

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

JANUARY 28, 1926

The meeting was called to order at the Fort Pitt Hotel, Pittsburgh, Pa., at 8 o'clock P. M., Vice President George W. Wildin in the chair.

The following gentlemen registered:

MEMBERS

Anderson, A. E.	Livingston, J. Warner
Beam, E. J.	Lohr, Allen W.
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Boyle, Edward A.	Lynn, Samuel
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Farrell, G. R.	Palmer, E. A.
Fettinger, H. O.	Parke, F. H.
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Foster, E. C.	Rauschart, E. A.
Fowler, W. E., Jr.	Redding, P. E.
Freshwater, F. H.	Reifsnyder, J. W.
Fults, J. H.	Sanfillip, P. C.
Gilg, Henry F.	Sattley, E. C.
Glenn, J. H.	Schrader, A. P.
Guignon, W. E.	Sewell, H. B.
Hansen, William C.	Shellenbarger, H. M.
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Joyce, Thomas J.	Smith, J. L.
Kamerer, R. W.	Snyder, Joseph
Karns, C. A.	Van Vrankin, S. E.
Kerby, Frederick	Whipple, A. L.
Ketchpel, Paul A.	Whitaker, J. A.
Ketterer, F. P.	White, C. M.
Kirkpatrick, H. F.	Wildin, George W.
Kummer, Joseph H.	Wood, E. H.
Lehr, H. W.	Wood, John
Lewis, Herbert	Wright, O. L.

VISITORS

Brown, Homer	O'Connor, J. D.
Cannon, T. E.	O'Sullivan, J. J.
Cassiday, C. R.	Rohyans, A. V.
Cunningham, W. P.	Schrontz, S. B.
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Gruitt, T. H.	Stanton, H. L.
Hill, H. H.	Starr, A. D.
Jex, W. A.	Thompson, R.
Johnson, Bert	Thompson, R. Kenneth
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Lewis, S. B.	Twinley, F. C.
Nash, R. L.	Watkins, Charles E.
Woodward, Robert	

VICE PRESIDENT: The Roll Call will be dispensed with, the record of attendance being had from the registration cards.

If there is no objection, the reading of the minutes of the previous meeting will be dispensed with, as they are to appear in printed form.

The Secretary read the following list of applications for membership:

Candee, A. H., Railway Engineer, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Recommended by A. P. Schrader.

Cannon, T. E., General Superintendent, Locos. & Equipment, P. & W. Va. Ry., Wabash Building, Pittsburgh, Pa. Recommended by C. C. Dambach.

Currie, Herbert J., Foreman, P. & L. E. R. R., 15 Union Avenue, Ingram, Pa. Recommended by R. M. Long.

Fenton, H. H., Railway Engineer, Westinghouse Electric & Mfg. Company, 567 Celeron Street, Pittsburgh, Pa. Recommended by Ralph W. Smith.

Gruitt, T. H., Machinist, P. & L. E. R. R., 1239 Pritchard Street, Corliss Station, Pittsburgh, Pa. Recommended by R. M. Long.

Hester, L. A., Sales Engineer, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Recommended by A. P. Schrader.

Hollingsworth, C. N., Chief Clerk to Chief Engineer, P. R. R.

System, 1117 Pennsylvania Station, Pittsburgh, Pa.
Recommended by A. P. Schrader.

Le Goullon, Frank E., P. Le Goullon Sons, 2647 Liberty Avenue, Pittsburgh, Pa. Recommended by D. M. Howe.

Mohr, Ray M., Sales Engineer, Westinghouse Electric & Manufacturing Company, 606 Whitney Avenue, Wilkinsburg, Pa. Recommended by A. P. Schrader.

Moses, Graham Lee, Engineer, Westinghouse Electric & Manufacturing Company, 423 South Avenue, Wilkinsburg, Pa.

McIntyre, R. C., Railroad Equipment Inspector, Carnegie Steel Company, 459 Dawson Avenue, Bellevue, Pa.

O'Sullivan, John J., Pipe Fitter, P. & L. E. R. R., 1130 Wayne Avenue, McKees Rocks, Pa. Recommended by R. M. Long.

Shean, Perry R., Motor Engineer, Westinghouse Electric & Manufacturing Company, 817 Glenn Avenue, Wilkinsburg, Pa. Recommended by A. P. Schrader.

Smith, Homer K., Railway Engineer, Westinghouse Electric & Manufacturing Company, 642 East End Avenue, Pittsburgh, Pa. Recommended by S. B. Cooper.

Tanner, C. J., Motive Power Department, Monongahela Railway Co., Brownsville, Pa. Recommended by A. P. Schrader.

VICE PRESIDENT: These applications will be referred to the Executive Committee in due course, and upon approval by them the gentlemen will become members without further action than the payment of the current year's dues.

The Secretary announced the death of Mr. A. W. Abel, a member of the Club.

VICE PRESIDENT: Appropriate memorial will appear in the Official Proceedings of the Club.

Most of you are aware of the sorrow that has come to our worthy Secretary in the death of his beloved wife. I have here a card of appreciation of the sympathy expressed by this Club to the family at the time of the bereavement:

"The family of the late Mrs. John D. Conway acknowledges with grateful appreciation your kind expression of sympathy."

VICE PRESIDENT: We have with us Mr. Charles E. Watkins, of Detroit, Mich., past District Governor of the Rotary

International, who will address us this evening on the subject of the Pittsburgh Forward Movement. I take pleasure in introducing to you Mr. Watkins.

PITTSBURGH FORWARD MOVEMENT

By Mr. Charles E. Watkins

Mr. Chairman and Gentlemen: I am very happy to have the opportunity to address you gentlemen. I wonder if we stop often enough to take stock of our own home town. My heart always warms when I hear a fellow boasting his town. In the city of Toledo, O., the Chamber of Commerce has a regular institution every year in the holiday time. Every traveling salesman who travels out of Toledo is the guest of the Chamber of Commerce at a great dinner. When I asked Mr. Saxton what the purpose of it was, he said, "I sell those gentlement Toledo. They are going out the fourth of January to the uttermost parts of the earth. If they can go out of their town with a feeling that they are really part of us, if they can go out as the evangelists of a great city, telling the story of the advance of our town, we have made a fine investment in this evening's entertainment."

I sat in a train in October when the World's Series was being played in Pittsburgh. I was coming in from Cincinnati. I was telling the occasion of my visit in the smoking compartment—where we settle everything. You know one of the questions that has been settled more times than any other in that compartment is the Volstead Act and the Eighteenth Amendment. I will give any man a new hat if he can sit in the smoking compartment thirty minutes and not hear it settled. We were coming, the room was crowded. A man said "You are going to Pittsburgh?" I said "Yes." He said, "Where are you going to stay?" I said, "At the hotel." Then I heard the anvil chorus. Men who lived in this town told me that all hotel reservations had been cancelled for weeks and they were paying \$8 and \$10 for a cot in the hall. I said, "I am in a bad fix. I have three rooms reserved and the only boy I have in the world is to be married in Pittsburgh the 14th of October and he is there today with his guests." What a laugh I got. They told me what would happen to me, when there were 30,000 people in this town looking for a place to sleep. I came in and went to the desk at the hotel and asked for my reservation. It was there. They were married on the morning of the 14th. I

told them to go on home. I would pay the bill. I wanted the boy to get that much of a start any way. That night I went out. When I came to pay my bill it was just exactly what I expected it to be, it was just exactly what I had paid for that same room on an occasion when there was no world's series. That night I started out again. And in the same forum going down to Cincinnati I heard the same anvil chorus again. I stood it just as long as I could and then I blew up. I said, "I have not words to express my contempt for any man who will sit around in a public place and knock his home town." One fellow said, "You think I don't know what I am talking about." I said, "No, you are absolutely crazy." They all arose in chorus to throw me out, and I said, "Just a minute. I will present to you Exhibit No. 1. That is the bill I paid not three hours ago." There was an old hotel man from Los Angeles on the car. He had not said a word up to that time. The bill finally got to him and when it did so my part was done. There was nothing more to say when he got through.

In this day of the changed order we ought to know our town. We ought not to emphasize its liabilities. We ought to be perfectly frank. I wonder if you gentlemen, who are men interested in transportation, realize what a peculiar position you are in. The standardization of manufacturing today has limited competition to such an extent that especially in the railroad business there is only one place where there is any competition, and that is competition in a superior quality of service. You can ship a carload of merchandise from Pittsburgh to Chicago by a number of different roads, but the rate is the same. There are certain reasons why I personally never ride on certain railroads in the United States. I go miles around rather than ride on them. They may not care anything for that, but there is a certain something that is lacking in the service of those railroads any my money when it goes under the little brass bar goes to some other company. Competition is in a superior quality of service. If you are going to get the volume of freight business from a certain concern you will not get it by cutting rates. There is going to be some subtle reason why certain business will find its way to your road. Isn't it strange? I know of one of the greatest shipping concerns in the central west, yet the great main trunk line of railroad that goes through that town for years never got a single load, though they were loading seventy to eighty cars a day in the busy season. It was all taken down to a small road. Time and again this sys-

tem sent its freight and traffic men to bid for that business. They said, "Not that we want the business, but it is a job to explain why it is that your great plant is on our main line and we do not haul a carload of it." It took years to change that condition.

What does it all come back to? It all comes back somewhere to the human element. And that is what I am talking about. The great City of Pittsburgh comes back to that human element, building the type of manhood that will exemplify Pittsburgh spirit. If you went to Atlanta, Georgia, today they would talk about the Atlanta spirit. When I was there in a great drive to raise \$300,000 for an advertising fund I said to one of the leading citizens, "What do you mean by the Atlanta spirit?" One day we were walking down street and he was not very positive in his answer. I met this gentleman and another one. We crossed the street on a corner where there was a statue of a man standing by a desk. And this man stopped and said to me, I will answer your question of yesterday now. When you ask me what I mean by the Atlanta spirit, I mean the spirit of Henry Woodfin Grady. Upon the base of that statue was written these words: "He died loving a nation into peace." When you talk of the Atlanta spirit, somewhere in the background is that marvelous orator of the southland who did more to bridge the chasm that was occasioned by the Civil War than any other single man.

So when we are talking of the great Pittsburgh Forward movement we are coming back to this one thing, that we are awakening in the hearts of men a spirit of reality, a spirit of genuine interest, a desire to build and to cultivate these better things. I said in a public meeting in this city recently that without the co-ordination of every force in the community the community could not make its best growth. We talk about Detroit, Mich. Detroit is a wonderful, growing metropolitan area. But it was not the automobile engineer that made it an automobile center. It was not Henry Ford, it was not the Cadillac, it was not the automobile manufacturers that made Detroit the great automobile center of the world. Do you know what it was? Go back to the days when the automobile industry was an infant and when men like Alexander Winton and R. E. Olds, pioneers in the infant industry went all over this country begging some bank to finance that industry, in Detroit, they found those bankers. It was the banking interests of Detroit that made the great Detroit automobile center. It was not the en-

gineers, it was not the builders. They were drawn there because of the convenient capital to expand the industry. Many a town has found that the neck of the bottle is some peculiar institution that had not yet got the vision of great city building. Let us remember that you can not build a city and leave out any particular phase of it. Industry is not attracted today by a bonus. There are fewer industries today in the United States than there were five years ago. I heard a report of a great industry that was being urged to locate a factory in a great city in the middle west. The reason this city did not get the industry could be stated in two or three simple phrases: First, the living conditions in which the men would be compelled to live were not such as would make them happy to the best degree. If you invest \$50,000,000 in an industry in Pittsburgh today bring in a lot of new people, it means a corresponding investment of that much money in the homes in which the people live. It may be invested by the corporation or it may be invested by the property holders in the city or by the men themselves. But if you invest money in a great plant there must be the home life, and that home life represents the building of homes and the housing of the employees. And in the changing order of today wonderful things have taken place. You can not say certain things end here or begin there. We used to say in our studies of economics that at a certain place production ends. Next we say, here manufacturing begins and there it ends; and here distribution begins and there it ends. And somewhere wholesaling and jobbing and retailing starts in. Now it is one great service task from the production of raw materials until you get your hands on the wheel of the automobile. I am doing something that adds to his comfort; he is doing something that adds to mine. You are doing something for me; I am doing something for you. That is our scheme of living. It is a great, fine, service task. It is meeting the human need. It is providing things that add comfort to men. Sit down and take stock of your home and ask how many people have been interested in the production of the things you use every day. Furniture. We never made as fine furniture in the world as we are making today. We can not make better furniture, we can not make better clothing. We can obtain the material quicker and cheaper and better, we can do anything that is to be done better than they ever could do it before.

I am glad my life was projected so it began in 1876 and grew along with the closing of that wonderful century. And

then it dawned over into the beginning of the new century, when great things were born, when the automobile industry was born, when I was a man. The aeroplane came into existence under my observation. The radio came into existence under my observation. I remember the first telephone in the little rural district. What a wonderful day we have lived in. The cities have been built since we were born. It is a wonderful development that you have seen and I have seen. Now the time has come when the challenge is to build in keeping with the natural things that have happened all about us. Literature. It was only a hundred years ago that a great Englishman said "Who would read an American book!" And there were twenty men living right then who could answer, "I will write a book that will be remembered when yours are forgotten." Poe, Longfellow, Bryant, men who were hearing the call and were writing literature for those big days.

Then I come to invention. Because of our peculiar organization, because of our experiment in universal education, because of our many natural advantages, we have an answer to the question of this great half century that has just passed. Now the question is coming to us, is America going to meet the challenge of the hour? I do not know whether we are going to keep pace in the organization and government of our cities with the organization and government of our railroads and of our industries. I would like to move tomorrow to any city in the United States which would adopt a form of government such as enables the Steel Corporation and the General Motors corporation to function as they do. If we can organize our citizens as we organize the Steel Corporation and the railroads and the automobile corporations, and appoint a board of directors to direct and elect a manager to manage and hire men to execute and "can" them if they do not do it. Somebody will wake up some morning any say there is a man who has guts enough to build a city. God help us to make Pittsburgh such a town. I do not know anything about your political situation, I just show you a picture that is away back in my mind.

Do you know why Dayton recovered so quickly from that terrible calamity in 1923. The answer is the Commissioner-Manager form of government that could realize a \$66,000,000 rebuilding program. How long would it have taken them to rebuild under the old political system of voting the \$66,000,000 of bonds. You would have had to have another flood and hold every fellow's head under water until he voted aye. Don't for-

get, the competition today between cities is intense. And do not let us kid ourselves, some cities are just beginning to get their swaddling clothes off. They are just beginning to wake up. They are just beginning to say, "We are going to start a new program." Somebody is going to get all wet. We are going to go some place; let us go. We are going to quit kidding ourselves. We are going to find somebody somewhere who will for the moment eliminate selfishness and say like those of old, let us all work together to build the city. Whenever I find a city that is doing that in the biggest possible way I am going to buy a railroad ticket there. I do not know where that city will be, but there are some of them getting together on the trail. Some great big fine cities this year have adopted a revolutionary platform for city government, Cincinnati, Cleveland, Rochester. There is a great moving in the mulberry trees. People are going to see that the organization that is building our corporations is not going to be left out in the building of our cities. We are applying the same principles to the solution of our common problems that we have applied to the building of our great industries.

When you do that, what will happen? I would not want to send one of my loved ones to a hospital where every twelve months they had an election and elected the surgeons and the internes and the nurses of the hospital. I would not even like to work for a railroad company that had an election every year of the engineers and firemen and track superintendents and even the wipers of the engines. I would walk. Wouldn't you? Can you imagine such a conglomeration as that? I know one town where the auditor is a barber; the sheriff is a ditch digger; the city judge is a plumber; the mayor is an undertaker; the policemen are ex-convicts. We have three federal men on it, at least they have been in the federal penitentiary. They were just appointed because they helped elect the mayor. I am not knocking, I am just telling facts. It is apparent there must be some settled organization to attack the great problems that are ours. The town that has a modern Chamber of Commerce, with a representative membership all over the city getting behind a program and working for that city, making the program from the membership. You say what you want and others who think the same way will help you put it over. You know how we used to appoint committees in the Chamber of Commerce. It was a joke. You put men on a committee to do something they did not care a rap whether it was done or not. "In the

first place I do not know anything about it and in the second place I do not care." Under a modern form of organization they send each man a questionnaire and say will you tell us what in your best judgment are the things that should be undertaken by the Chamber of Commerce this year as the major activities. You write down four things. In a few days you get a telephone call saying there would be a meeting of men interested in the first thing you had mentioned as my major activity. You come down and meet with other gentlemen and women who are interested in the same thing and see if a plan could be devised to put that through. You went down and met a hundred people who thought the same you did. We elected the best men in that group to be a small committee to stand behind track elevation costing over \$100,000,000.

What is the use in doing all these fine things if it does not make a more comfortable home where your boys and girls can grow to manhood and womanhood and be trained for the fine things that tomorrow must be theirs. The finest spots in your life will be by-products of the inspired influence of some boy. I would like to tell you a story. During the war, in Muncie, Ind., I was asked to be the local Secretary of the Y. M. C. A. I was too old to get into the war service and all the real secretaries had gone to the war. For two years I had that task. We had a boy in that community who was the outstanding boy for cussedness. He broke every rule there was. Everybody in the building had had trouble with him. One day I went into the building the boy had said something to the old janitor and the old man had smacked him. When I went down they were throwing a bucket of water on him to bring him to. I saw there was nothing to do but take the boy out and send him back home. I said to him, "Don't come back here again, because if you do, anybody in the building will put the boots to you." He did not come back, naturally. When Christmas came, your boy and mine were wearing the khaki and for the first time in that boy's life we were going to sit down to a Christmas dinner without him. We were all a little tender that year. As I sat there in my office that night every boy in town came up before me, and there I saw this boy whom I had thrown out of the building. His father had been dead several years. The only thing he ever did to commend him was to die. He left the wife and two children. This boy was now 16 years of age and just as bad as he could be. He was going just as rapidly as he could the wrong way. The thought came to me

that there was the challenge to help that mother and that boy, and I was not big enough. I had done the easy thing and washed my hands of the whole job, and now he was gone. The more I thought of it the more it appealed to me that I was not big enough to handle the situation that was presented to me. I wrote him a long letter that night. I asked him to come in and see me. He came in the next night with the letter in his hand, safety first. I shut the door on him a little before 8 o'clock. I went round and round with him, but I could not move him. He was harder than nails. I could not crack his shell any way. I told him the story of his father, a story he had never heard. I told him the story of his mother, of the cloud that had enveloped her almost from the day of her marriage and had hung like a pall over her life ever since. It never phased him. About 11 o'clock I was giving up, feeling that the only thing to do was to say what I had said the last time when I had sent him home. I said to him, "In all the earth there is only one human being that can take the sadness out of your mother's life and put a smile back in it, and that child could do it if he would." Just the moment I said that I saw his face change and knew I had him. I kept on telling him what might happen if he would go in and say to his mother that all the trouble she had had was enough and he was going to turn a new leaf and make her happy. As I talked, the tears came down his face and he put his head down on his arms and burst into sobs. I put my arm around him and let him cry it out. He leaped up and said: "Do you believe that?" "Absolutely." I turned to the desk and got a membership card, and as he stood there looking at me I signed it, for a year's membership, paid in full, with the compliments of the Secretary. I said, "There is evidence that I do believe it." Then he broke down again. "Does that mean that I can go back into the gym?" "That means that you can carry the building off if you want to. It is up to you. I am going security for you." He walked over and reached out his hand and said, "God helping me, you will have no more trouble with me from now on." The next morning he came over and had a long conference with the Physical Director, who had tried in every way to help him. I later saw him play the hardest game of basketball I ever saw him play. I rooted for him all the time, and when it was over, I asked the Physical Director to send him to my office, I wanted to see him. He came into my office radiant with happiness. He had won his game by two points. When he came in I looked him over and said,

"Do you know I am just about as proud of you as if I owned you. You have certainly made good with a bang and I am for you." He said with tears in his eyes, "That is what I have been working for. I wondered when it would come." I said, "It has come now."

I believe if you take any man's life you will find an interest like that. I do not care whether he is president of the company or a mechanic, his heart beats just the same when you touch his boy. You can get just as quick to his heart no matter what his condition. The saddest man I ever saw in my life had exhausted every means to help his boy. He said, "Oh, God, tell me where I have failed with this boy!" He was a man who could have written his check for a million dollars.

There is the story after all. Building a great city is simply building great men, putting them to the same task, building a great city greater and greater—that is the task for tomorrow. So I have been very happy to have had the privilege of saying just this little word of inspiration. If your railroad succeeds it will be because the human element is developed. If your business succeeds it will be for the same reason. If your city is to succeed it must be the same thing, absolutely, first, last and always.

VICE PRESIDENT: We have with us the Secretary-Manager of the Pittsburgh Chamber of Commerce, who is very much interested in this forward movement. His time is very limited as the Chamber is putting on a very elaborate program this evening, but I will ask him to say a few words to us at this time, if he will kindly do so. Mr. Snell, Secretary-Manager of the Chamber of Commerce.

MR. A. V. SNELL: Mr. Chairman and Gentlemen of the Railway Club of Pittsburgh: I appreciate very much this opportunity of meeting you here tonight as a fellow citizen—though a rather new one, of Pittsburgh, and when I refer to Pittsburgh I refer to all that we commonly know as Greater Pittsburgh, the Pittsburgh with nearly two million people within a thirty-mile radius. I have been in Chamber of Commerce work for nearly twenty years in different parts of America and our work so closely relates in a great many of its phases to that of the commercial and industrial promotional work of the railroads that I feel very much at home among you. I have for a number of years been especially related to you through our traffic departments and through our men in charge of traffic

and commerce matters. I am therefore, especially interested in the development of traffic, especially in its bearing on commerce and industry. So I do appreciate the opportunity of coming here and meeting you face to face and talking with you for a few moments, hoping that I may say something that will be helpful to you.

I hardly know if you understand what a Chamber of Commerce really is. I have found in Pittsburgh, as in very many other places, that few really do. It is a cross section of a city itself, except that it is related to business on very broad terms. A Chamber of Commerce is a business association of business institutions for the protection and promotion of business. When I speak of business, I speak of it in the larger sense, or of that great body in the city which is differentiated from labor or agriculture. The Chamber of Commerce is the clearing house and power house of every community. Organizations like yours, both business and social, are absolutely necessary for the development of special phases of any community. Sometimes we think we have more organizations than are necessary, but we need them in a great community like ours.

I heard a story about a big strike you had here in one of the big plants. The head of the plant was very much worried. A big mob began to form and he put in a call for the state police. In about half an hour one lone state trooper put in an appearance. The superintendent said: "For heaven's sake, I sent for the state police. Do you see that mob out there?" The trooper said: "You have but one mob?" "Yes." "Well, I am one trooper. I will finish that mob." He was organized. There was an organization back of him. It is the same in community building. We need more of these organizations. We need a strong representative retail merchants' association in Pittsburgh.

There are many other factors affecting the welfare of any city which your organization cannot handle and which no single organization can handle. A strong Chamber of Commerce representative of all, is a real necessity. Just as your city is your political government, your Chamber of Commerce is your business government. It should be so set up that its machinery can work effectively and promptly on great municipal and commercial problems. A Chamber of Commerce is like a fire warden. He may be there for months and do nothing except watch. But the moment a small fire starts he is ready to promptly bring fire forces to bear, saving thousands

of dollars of damage. That was true of the Chambers of Commerce of San Francisco, of Galveston, of Dayton, of Jacksonville, when disastrous emergencies arose.

Pittsburgh has wrought wonderful things in the past. Pittsburgh has had great world figures. These men are gone. The City of Pittsburgh of today is you and men like you. What are you going to do with it? The Automobile industry has gone to Detroit, why not Pittsburgh? We should know why it happened and then apply the knowledge and experience to the greater and rapidly developing industry of today. We know what has happened during the last twenty years in America. Giant industrial plants! Wondrous inventions! Only a few years ago our grandfathers worked at the same bench with their employees. They were friends and comrades. That is past. But new and wonderful factors are arising in America and once more conditions change. Are we to return to the old comradeship by a new highway? With immigration restricted, with our great vocational schools and constantly improved industrial conditions, does it mean that the employee of tomorrow is to be part owner at least of the industry. If so, he will live only in those cities that offer the best living conditions. There will the future industry be located. Should we not study how we can secure for our Pittsburgh better living conditions, bringing new industry, keeping what we have. We should always realize that all these new elements of our modern industrial life bring new problems, new dangers and new responsibilities. The city that is not organized and not awake to take advantage of these all new developments, will fall behind in the race. Pittsburgh has not gone backward. Pittsburgh is going ahead. Only competitive cities are organized to take advantage of these new factors and are planning and building for tomorrow.

We are still making the steel that Detroit is turning into automobiles. We are making the steel that is shipped to Connecticut and coming back as finished hardware. Why Detroit? Why Connecticut? Highway, transportation, street and rapid transit, are Pittsburgh problems. There are great problems. The solution is organization, the capitalization of our leadership, supported by thoughtful public spirit. We have wonderful features in Pittsburgh that can be developed. An outstanding challenge!

The Chamber of Commerce urges that in these coming weeks, yes, and throughout all the years that we together work

and think constructively for our city—constructively and not destructively. May we have your help? Will you help us to make the Chamber of Commerce a strong and constructive force in this community?

VICE PRESIDENT: I understand Mr. Watkins has to leave right away. I was hoping he could be with us long enough that some of the members might ask him a few questions, to which he could give illuminating replies.

MR. CHARLES ORCHARD: Mr. President, we have been very much honored by our speakers, Messrs. Charles E. Watkins and A. V. Snell, and I desire to present a motion extending a vote of thanks to these gentlemen for their presence and the interesting address by each. The motion was duly seconded and carried by a rising vote of thanks.

VICE PRESIDENT: I wish to express to you the appreciation of this Club for your fine advice. I think you will find the individual members of this Club doing as much individually as any other organization in the city to follow out your suggestions.

MR. HENRY F. GILG: Before the Secretary of the Chamber of Commerce goes I would like to give him a little thought. I want to tell him that before he came to Pittsburgh there was a gentleman from the eastern part of the state who made a great part of his wealth in this district, who said, quite number of years ago, that Pittsburgh is a has-been. Ever since that time there have been more knockers in Pittsburgh than there are boosters. That is the trouble with Pittsburgh, and I am glad to see that that is the first thing you are striking at.

MR. SNELL: Instead of telling him he is a liar, let us show him that he is not telling the truth.

VICE PRESIDENT: This seems to leave us without any discussion, unless someone has something to add for the good of the order.

Upon motion, adjourned.

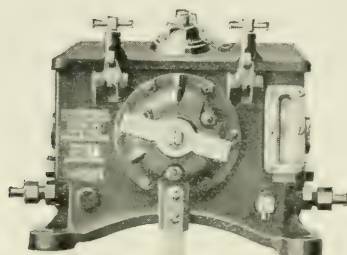
J. D. CONWAY, Secretary.

In Memoriam

A. W. ABEL,
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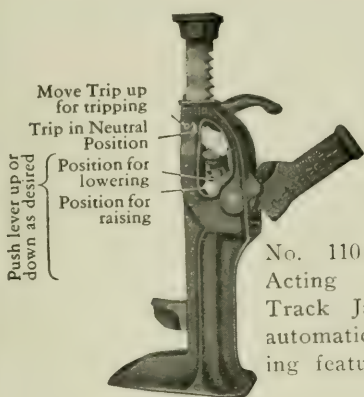
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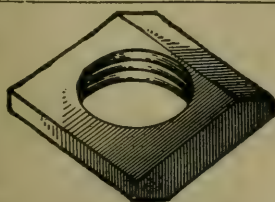
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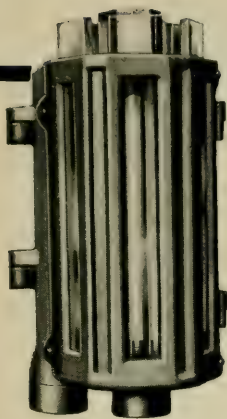
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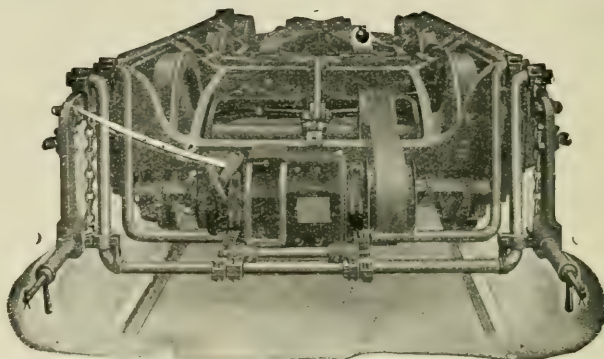
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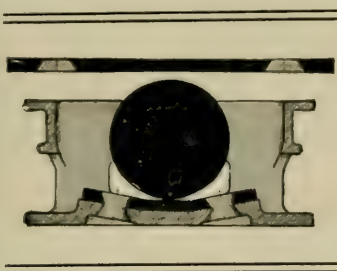
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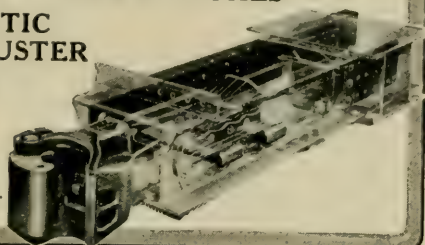
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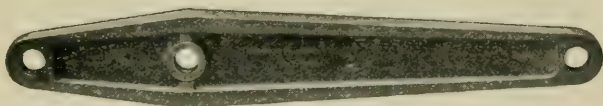
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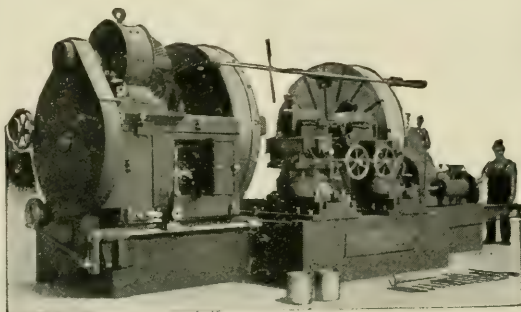
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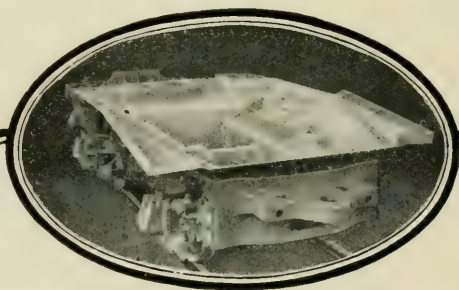
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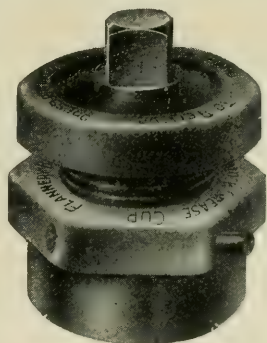
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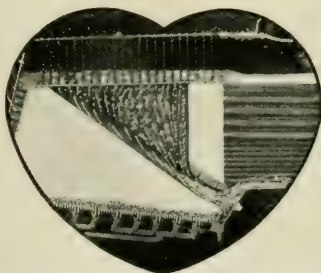
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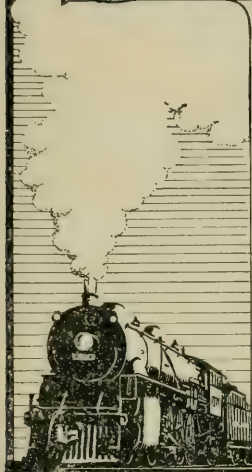
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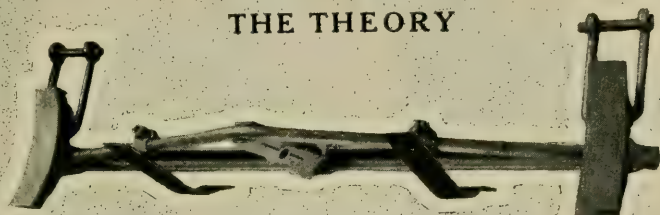
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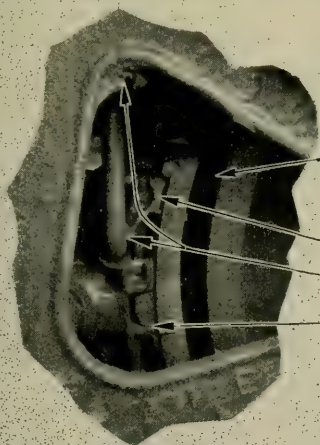




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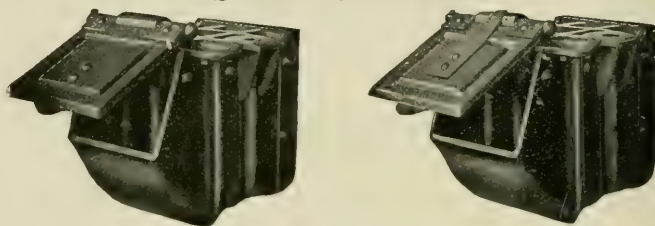


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Past Presidents

*J. H. McCONNELL.....	October, 1901, to October, 1903
L. H. TURNER.....	November, 1903, to October, 1905
F. H. STARK.....	November, 1905, to October, 1907
*H. W. WATTS.....	November, 1907, to April, 1908
D. J. REDDING.....	November, 1908, to October, 1910
*F. R. McFEATHERS.....	November, 1910, to October, 1912
A. G. MITCHELL.....	November, 1912, to October, 1914
*F. M. McNULTY.....	November, 1914, to October, 1916
J. G. CODE.....	November, 1916, to October, 1917
D. M. HOWE.....	November, 1917, to October, 1918
J. A. SPIELMANN.....	November, 1918, to October, 1919
H. H. MAXFIELD.....	November, 1919, to October, 1920
FRANK J. LANAHAN.....	November, 1920, to October, 1921
SAMUEL LYNN.....	November, 1921, to October, 1922
D. F. CRAWFORD.....	November, 1922, to October, 1923
GEORGE D. OGDEN.....	November, 1923, to October, 1924
A. STUCKI.....	November, 1924, to October, 1925

*—Deceased.

PROCEEDINGS OF MEETING

February 25, 1926

The meeting was called to order at the Fort Pitt Hotel, Pittsburgh, Pa., at 8:00 o'clock P. M., President Frank G. Minnick, in the chair.

The following gentlemen registered:

MEMBERS:

Ainsworth, J. H.	Durant, C. H.
Allan, W. J.	Emery, C. W.
Allen, Harvey	Emery, E.
Allison, John	Farrington, A. R.
Altsman, W. H.	Farrington, R. J.
Ambrose, W. F.	Fenton, H. H.
Anderson, A. E.	Fink, A. J.
Angstadt, Edward D.	Fisher, G. M.
Ashcraft, E. J.	Fisher, J. J.
Babcock, F. H.	Fowler, W. E., Jr.
Balzer, C. E.	Fritz, A. A.
Barrett, R. L.	Fultz, J. H.
Bartholomew, W. S.	Furch, G. J.
Beam, E. J.	Geddes, James R.
Bednar, J. J.	Gerard, F. R.
Berg, Karl	Gilg, Henry F.
Berghane, A. L.	Gipson, A. M.
Blakeley, T. M.	Glenn, J. H.
Boyle, Edward A.	Godfrey, Clark H.
Braun, O. F.	Goff, J. P.
Calahan, Charles R.	Greene, W. F.
Campbell, C. W.	Gregory, W. H.
Campbell, J. T.	Grieve, R. E.
Cannon, T. E.	Gruitt, T. H.
Car-Skaden, W.	Hale, O. R.
Chase, C. N.	Hansen, William C.
Christiansen, William	Harris, John P.
Christy, F. X.	Hench, N. M.
Conway, J. D.	Hilstrom, A. V.
Cooper, J. P.	Hoffman, C. T.
Cotter, George L.	Hoover, J. W.
Crawford, D. F.	Hoover, R. C.
Croft, C. A.	Howe, D. M.
Cunningham, R. I.	Hudson, W. L.
Currie, Herbert J.	Hughes, J. E.
Dambach, C. O.	Hunter, Bernard E.
Davis, C. E.	Hykes, W. H.
Davis, Charles S.	Jenkner, Oscar
DeLaney, V. W.	Jones, D. J.
Devans, E. J.	Jungbluth, Adolph

Kamerer, R. W.
 Kelly, H. B.
 Kelly, J. P.
 Ketchpel, Paul A.
 Klinefelter, F. A.
 Kroske, J. F.
 Lanahan, Frank J.
 Landefeld, R. H.
 Lee, L. A.
 Lehr, Harry W.
 Lobe, P. L.
 Lohr, Allen W.
 Long, R. M.
 Lowe, W. D.
 Ludwig, C. T.
 Lynn, Samuel
 Maliphant, C. W.
 Mann, N. T.
 Merscher, John
 Miller, George
 Milliken, J.
 Minnick, Frank G.
 Mitchell, Frank K.
 Mitchell, W. J.
 Mitchell, W. S.
 Morris, J. H.
 Morse, J. W.
 Moyer, Oscar G. A.
 Muir, R. Y.
 McCarthy, F. W.
 McGirk, John D.
 McGregor, D. C.
 McLaughlin, H. B.
 McNiff, John L.
 O'Connor, C. D.
 Orchard, Charles
 Orndorff, J. R.
 O'Sullivan, J. J.
 Painter, Joseph
 Parke, F. H.
 Penn, William

Zollinger, Samuel W.

Peoples, J. S.
 Pickles, H. D.
 Prouty, E.
 Provost, S. W.
 Pugh, J. R.
 Purnell, C. S.
 Rabold, W. E.
 Ralston, J. A.
 Redding, D. J.
 Redding, J. H.
 Richardson, H. R.
 Robinson, G. H.
 Rogers, Robert
 Ryan, William F.
 Sattley, E. C.
 Sayre, F. N.
 Shean, Perry R.
 Shellenbarger, H. M.
 Sheridan, T. F.
 Smith, Frederic M.
 Smith, J. L.
 Snyder, Joseph
 Spencer, Kenneth W.
 Sterling, C. C.
 Stevens, L. V.
 Strohmer, John L.
 Stucki, A.
 Sutherland, L.
 Tanner, C. J.
 Walther, G. C.
 Weissert, W. J.
 Wheatley, William
 White, A. B.
 Williams, E. V.
 Wood, E. H.
 Wright, James H.
 Wright, O. L.
 Wyke, J. W.
 Wynn, E. M.
 Wynn, H. R.
 Wynn, M. E.

VISITORS:

Brinkhoff, W. H.
 Carson, G. E.
 Champion, James H.
 Christy, George
 Close, Robert
 Courtney, H. C.
 Cunningham, W. P.
 Denser, J. M.

Donnelly, William C.
 Downes, D. F.
 Eagan, J. T.
 Ferguson, Jas. H., Jr.
 Follette, W. F.
 Givler, Hugh C.
 Grove, L. T.
 Hammond, C. W.

Harris, J. L.
 Harshberger, P. L.
 Herald, M. A.
 Hoerner, A. S.
 Hogg, Francis
 Jones, Richard I.
 Kelley, R. G.
 Kopp, M. S.
 Korb, A. E.
 Latimer, W. B.
 Lewis, S. B.
 Martin, George F.
 Milbank, E. F.
 Mohr, R. M.

Moore, R. L.
 Nash, R. L.
 Newell, G. K., Jr.
 Post, F. H.
 Pyle, P. S.
 Showalter, Joseph
 Smith, Simon B.
 Sneck, H.
 Snyder, W. H.
 Stebler, W. J.
 Stromer, Homer H.
 Sykes, A. H.
 Tubbs, L. G.
 Woodruff, R. E.

PRESIDENT: The Roll Call will be dispensed with, the record of attendance being had from the registration cards.

If there is no objection, the reading of the minutes of the previous meeting will be dispensed with, as they are to appear in printed form.

The Secretary read the following list of applications for membership:

- Burnette, G. H., Chief Engineer, Monongahela Railway Co., Brownsville, Pa. Recommended by A. P. Schrader.
- Carson, G. E., "Retired" M. C. B., N. Y. C. R. R. Co., 808 Bellaire Avenue, South Hills, Pittsburgh, Pa. Recommended by Henry F. Gilg.
- Champion, James H., Chief Clerk, Pennsylvania Railroad System, Box 113, R. F. D. 2, Sharpsburg, Pa. Recommended by G. J. Furch.
- Clare, Robert, Mechanical Expert, Locomotive Stoker Company, 30 General Robinson Street, N. S., Pittsburgh, Pa. Recommended by L. E. Osborne.
- Earle, R. T., General Engineer, Westinghouse Electric & Manufacturing Company, 415 Kelly Avenue, Wilksburg, Pa. Recommended by R. W. Smith.
- Eckerson, H. D., Special Service Engineer, Locomotive Stoker Company, 30 General Robinson Street, N. S., Pittsburgh, Pa. Recommended by L. E. Osborne.
- Givler, Hugh C., Machinist, Pennsylvania Railroad System, 528 Fifth Street, Pitcairn, Pa. Recommended by R. C. Hoover.

- Harris, J. L., Traffic Representative, National Carbon Company, 502 Jeannette Street, Wilkinsburg, Pa. Recommended by J. T. Campbell.
- Herzog, Charles C., Lead Clerk, Pennsylvania Railroad System, 320 First Street, Aspinwall, Pa. Recommended by G. C. Burke.
- Hogg, Francis, Engineer of Tests, Locomotive Stoker Company, 30 General Robinson Street, N. S., Pittsburgh, Pa. Recommended by L. E. Osborne.
- Jones, Richard T., Gang Foreman, Pennsylvania Railroad System, 24 Ann Arbor Avenue, West View, Pa. Recommended by G. J. Furch.
- McGann, J. F., Representative, Premier Staybelt Company, 2101 Oliver Building, Pittsburgh, Pa. Recommended by Henry F. Gilg.
- McKedy, H. V., Representative Railway Department, The Patterson, Sargent Company, 30 Church Street, New York, N. Y. Recommended by J. D. Conway.
- Nash, R. L., Special Apprentice, Westinghouse Air Brake Company, Tonnaleuka Club, Wilmerding, Pa. Recommended by N. T. Mann.
- Saul, Raymond P., Storekeeper, Pennsylvania R. R. System, 315 Evergreen Avenue, Millvale, Pa. Recommended by J. E. Brower.
- Schultz, Charles H., Distributor, E. F. Houghton & Company, 322 Dunlap Street, N. S., Pittsburgh, Pa. Recommended by D. J. Redding.
- Sipple, John J., Clerk, Pennsylvania Railroad System, 23 Hays Alley, Millvale, Pa. Recommended by G. C. Burke.
- Spinning, Charles F., Representative, Graham Bolt & Nut Company, Box 455, Pittsburgh, Pa. Recommended by Henry F. Gilg.
- Sykes, Arthur H., Safety Agent, P. & L. E. R. R., 707 Florida Avenue, Dormont, Pittsburgh, Pa. Recommended by F. H. Babcock.

PRESIDENT: These applications will be referred to the Executive Committee in due course, and upon approval by them

the gentlemen will become members without further action than the payment of the current year's dues.

The Secretary announced the death of Mr. A. W. McCaslin, a member of this Club, who died February 19, 1926.

PRESIDENT: Appropriate memorial will appear in the Official Proceedings of the Club.

The President made a plea for a concerted movement of the membership to advance the Club and support its officers by an increase in membership through the personal activity of each member.

He followed this by presenting a proposal of the entertainment committee for a social evening, to which the ladies will be invited, with dancing, cards, etc., for entertainment. After an expression of opinion on the part of members present, a show of hands indicated that there was no opposition to the plan proposed, and the committee was authorized to proceed with their plans accordingly.

The speaker of the evening is not unknown to you, and while to my knowledge he has never been a Pittsburgher, he was for a great many years associated with the Erie Railroad at Youngstown and has many Pittsburgh friends; furthermore, I know it to be a fact that when he was in Youngstown he was very much a Pittsburgher, and in talking with him tonight I find that the same live interest in Pittsburgh is in his heart that was when he was located at Youngstown. He is going to address you on a subject that is to me especially interesting. On the railways we have a great many failures. The subject of the speaker tonight is Man Failures—Cause and Remedy, to be presented by Mr. R. E. Woodruff, Superintendent Erie R. R., Buffalo, N. Y.

MAN FAILURES—CAUSE AND REMEDY

By MR. R. E. WOODRUFF,
Superintendent, Erie Railroad Company, Buffalo, N. Y.

Mr. President, Members of the Railway Club of Pittsburgh, and Guests: I felt honored and thank you for the invitation to be with you tonight. You men of Pittsburgh seem to do things in a big way. When I heard your President, tonight, asking for 1200 new members this coming month I won-

dered if he expected as much of this paper as he did of an increase in membership.

As we go along in this discussion you will, perhaps realize the entire subject is not covered by this paper. Perhaps you will understand the thought of it better if you will keep this point in mind, that while we have all kinds of man failures, the kind of failure that we have considered chiefly is that of a man who is chronically in trouble. The man that is a problem to the Supervising Office, who seems to be intelligent and earnest and yet is continually in trouble. Sometimes he is called "Stubborn," sometimes a "Bull Head," sometimes worse names. If you will keep this individual in mind as the paper progresses you will understand better the points I have tried to make.

When we have a break-down or an interruption in our service, we have been trained to locate the cause as accurately as possible. These are usually classified into four groups: failure of track or structure, failure of equipment, failure in organization or method, and man failure. In the case of equipment or track failures, we look for flaws in the material and often recommend changes in construction to overcome defects. When it is found that our methods of handling are wrong, new rules or instructions are promulgated to prevent a recurrence. We have test departments, experts and specialists who devote a great part of their time to these questions and there is a constant interchange of thought between men on different railroads, resulting in better performance.

When, however, there is no defect in equipment or track or in the prescribed methods of doing work, and yet an error has been made, caused by lack of judgment, carelessness, indifference or lack of appreciation of the importance of the job, we call it a man failure. And, as in the case of the other failures, we attempt to take such action as will prevent repetition. Our line of reasoning is apt to be this: We assume that the man had been properly instructed, knew the rules and requirements and simply did not carry out instructions, and therefore feel that he should be punished with due respect to the gravity of the offense. So discipline is applied for his benefit and improvement, and so that others in similar occupations will also take heed.

Some discipline is intelligently administered. Some does

not accomplish its purpose. Here is a case. The crew of a freight train left a facing point main track switch open. Luckily no accident resulted as the open switch was found and closed. The conductor and flagman at fault were each given thirty days suspension to make them and others appreciate their responsibility so that they would thereafter make certain of leaving switches in correct position.

However, a higher officer to whom the case was immediately appealed, reduced the suspension to five days each. A short time later the same switch was left open and a fast train ran into the open switch and the engine turned over. This was a man failure, of course, but was not the management also to blame? If the right mental attitude had been acquired by the road men following the first case, would the second have occurred?

It is our duty to get results—to get our men to act safely and correctly and we are morally responsible for their training and their actions.

How do we measure up to this responsibility? Most of our working hours are spent in dealing with human nature; investigating, inspecting, influencing, correcting or disciplining men. It is our job, not simply to punish or to apply discipline so that we can say that some action has been taken; but to correct and re-educate the men who make errors and who are out of tune with the rest of the organization. It is not the amount of discipline, but the way it is handled by the local officers that determines the reaction of the men involved and therefore, its permanent value. It is our job to handle men as intelligently as an engine man handles his locomotive or as a stenographer his machine.

Yet how much study is given this question? Man is the most marvelous machine that has ever been constructed. He works efficiently with a daily portion of fuel. He is maintained automatically. His combustion and lubrication are perfectly arranged. His signal system is a model not yet approached by other machines. The extent of his capabilities has not yet been reached.

But it must be admitted that very few of us have studied human beings as an engineer studies engineering; as a craftsman learns his trade or a professional man his profession.

As a rule men are made into foremen, chief clerks, and minor officers without any definite training in the handling of men except as gathered from their own experience. It is true

the need for such training has been recognized and a number of so-called foremen's training schools have been established. Perhaps in the future we will look back and wonder how we got along without them.

Let us analyze the question. We are dealing with human beings and we all have similar aims and desires. We are all employes of the same railroad. We are selling our services in return for a stipulated wage. We all have ideals concerning our jobs. If the job is to our liking and we become enthusiastic about our work, there is little question about our efficiency. As railroad men, we have the play instinct highly developed. We know instinctively that when we like our work, we do not easily tire; and we know that when our hearts are not in it, our work becomes drudgery and causes excessive fatigue. There are some men, of course, who are not adapted to railroad work and should not be hired, and when it has been found that any are not suited, they should be advised to seek jobs elsewhere.

It is appreciated that the working conditions must be right if men are to be contented and do their best work. If the majority are **not** pleased with their working conditions, then it is the obligation of the management to find and correct the trouble in its policies. If the majority **are** satisfied and a few are discontented, then perhaps we can look to the few to find the reason for their discontent.

Therefore, let us analyze briefly, the things that men expect in their jobs. To do this, let's put ourselves in their place, knowing they would probably like the same treatment that appeals to us. Here are some of them:

We wish to overcome obstacles, accomplish difficult things. An experienced fisherman likes to catch game fish that are difficult to land; a golf expert likes to play difficult courses to bring out his skill. So in our daily work, we take pride in accomplishing things that are more difficult than the average.

Because we are creatures of habit, we like to have some regularity about our work and methods. Nevertheless, we like to have some new interest—some new problem to master—to keep life from becoming too monotonous. However, too much variety would be fatiguing. Therefore, we like a mixture of variety and monotony.

We want to work for a good boss; one who knows what we are accomplishing—who appreciates good work—whom we can consider as a friend. This is especially important on a railroad because of its diversity. Locomotive engineers like to be

directed by a man who has been a locomotive engineer—who understands their language—their troubles—their operation. Agents do better work when they report to a man who has been an agent and who understands the complexities of an agent's job.

We want a chance to see results—to measure the fruits of our work. In this we have the artist's instinct of creation and take pride in a job well done.

We do not like to be on the extra list. We want regular jobs with definite titles. The title of janitor means as much to some as our titles do to us. We look to promotion for our reward.

We want to work where we can have a feeling of loyalty to our company. We want that company favorably known—an institution that is worthy of our loyalty and co-operation and along with this is the feeling that we want to work for a company that is loyal toward us as well. We all want to be treated as human beings—not as mere cogs in a machine nor as a commodity. Each man likes to feel that he is an individual performer and that the character of his work is known to his superior.

We like to have pleasant relations with our co-workers. In fact, men prefer to work for less money on a congenial crew or in a pleasant office.

If a job does not meet these qualifications, the man will be discontented and his work will be indifferent. In fact, an analysis of most man failures will show the cause to be a violation of some of these principles so far as he is concerned. It must be understood in this discussion that a reasonable understanding of the rules and regulations is assumed. Men cannot be held accountable for what they do not know; and in a sense, the entire elimination of man failures is a question of education.

We know that we have uniform rules for the guidance of our men in train and engine service. We have standard practice cards and written regulations designed to bring about uniform performance and quality of work in our shops. Many men on each railroad have exactly similar jobs. They run the same kind of trains, do the same work in shops, on tracks or in offices.

While we expect a uniform performance, we however, appreciate that men differ from each other in many ways. We rarely mistake one man for another. Even their voices are

easily recognized and we know that they differ in their actions and reactions.

When the great majority of men perform satisfactorily under a given set of instructions and rules, and a few do not, we must go beneath the surface to find the reason. There is nothing really mysterious in this. There is a cause and reason for all we do if we know how to find it.

If you swear at a man and call him names that he thinks are unjustified, what will he do? If you compliment another and tell him that he is a fine fellow, can you predict his reaction? Certainly, because you know what each of them will think.

This, then, is our starting point. Thinking precedes all action. To illustrate: we must think of a word before the vocal organs can utter it. To raise our hand, an impulse from the brain through the nerve causes the muscle to contract, thereby raising the hand. The brain is the switchboard and thinking is the motive power of our human machine. It is a well known fact that every thought has a tendency to make us act even though some other influence may act as a brake and delay the movement temporarily or permanently.

It is true that some thinking is more or less involuntary. We laugh or cry even when we do not wish to, because of the influence of our thoughts. When we have done the same thing often enough it becomes a habit, and no conscious thought is necessary to perform the action. This is made possible by the fact that the brain is also a filing system. Whatever we hear, smell, taste, see or feel makes an impression on our minds. We may or may not remember that impression. If it is important or new, we easily remember it. Many things, however, are forgotten for years and are only remembered when some association calls them to mind. These impressions become what we call experience and each new occurrence thereafter is thought of in the light of other happenings of similar nature, the record of which is often recalled unconsciously.

If two men see a bull dog, one of them, a lover of animals, may approach and see nothing to be afraid of. The other is frightened and keeps his distance. One might say that **his** sense of danger was because of the dog, but in reality it was caused by his own thinking. If the dog were the real cause, **both** men would have been afraid. Their actions depended entirely on their thinking as determined by their experiences.

It is for this reason that we quickly blame our faults on others when the blame really rests with our own thinking. When we change our thinking, our actions are changed, whereas our actions are often ascribed to temperament, physical condition or some other peculiarity. We all know that our thinking and our actions leave their marks. It is not hard to distinguish a happy person from a grouch and much can be told about a man's thinking and habits by his personal appearance.

Why do we think? Thinking is not necessary when everything runs smoothly. We think only to overcome obstacles—to achieve some end—to remove obstructions from our pathway. We appreciate that if we are to take the right action, we must think and plan logically. We know that we do not always take the right action because our reasoning has been unsound.

What then is thinking? A mere succession of mental pictures similar to a moving picture may not be thinking. True, thinking and reasoning imply discrimination—seeing things in their proper light—locating the true cause for any effect. “Thinking,” says Professor Swift, “is largely controlled by inheritance, tradition and environment, including early education and pressure, and it is partly for this reason that experience, as usually accepted, exerts such a dominating influence.” Merely seeing things occur does not constitute true experience. An additional requirement is an understanding of causes and effects, seeing the connection between the action and what precedes it.

Usually, however, in thinking, we seem to run in circles. We use our own experience as a guide, and the circle will be large or small, depending on the breadth of our experience or in proportion to our ability to discover value in the experiences of others, and so add them to our own. When our circle is small, our thinking will not be logical, because our experience has not been broad enough to give us a proper viewpoint. Therefore, it is very easy for us to be biased. We hold the opinions of our forefathers, parents, associates or our friends. We dislike to hold an opinion contrary to the majority. We are apt to be conservative and opposed to changes or innovations and we dislike to discard a belief once it has formed. Therefore, we build up fixed opinions based upon our experiences and impressions.

Such related experiences that influence, consciously or unconsciously, our ideas and opinions are called by psychologists, mental complexes. This is simply another term for what we

sometimes call idiosyncrasies, crazy or cranky notions, pet ideas, hobbies and prejudices. Having a complex on any particular subject, we refuse to follow a line of reasoning that is antagonistic to it. Some complexes, such as golf or radio, are harmless and render a service as recreation. Yet others are the causes of blind obedience to prejudices. They determine the course of our reasoning and restrict logical thinking to an extent not always realized. Each of us thinks that we are of open mind and amenable to reason. In reality, however, craving consistency, we often first form an opinion and then look for reasons to support it. We ask advice—not to gather information, but to enlist support to our plan. We all have these complexes. When we have recognized them in ourselves and in other people, we have located the cause for many of our thoughts and subsequent actions.

Fear also interferes with logical thought. No one can do his best work or thinking when afraid. Fear warps his judgment and makes him excitable and frequently leads to mistakes.

Hurry acts in the same way because one who hurries, says unconsciously, "I am afraid I will be late," and we all know, "the more haste, the less speed." The mental condition which is produced by a feeling of hurry is always detrimental to speed, accuracy and personal safety.

Despair—the feeling of "I can't" stops all progress. When we are affected by a feeling of hopelessness, we cannot think logically and so cannot act properly.

Some years ago, a man was appointed agent at an important station. It was a difficult job and the operation of the station was very poor. The morale was low and labor troubles were frequent. Errors were out of all proportion to the amount of business being handled. As could be expected, it was hard to make headway in reorganization. The new agent was sincere and conscientious. After being on the job a month, he became discouraged, and as a result, the operation became worse.

About this time, the superintendent called to see what was the trouble. The agent explained his difficulties and said that he had worked hard but did not seem to get anywhere, was discouraged and felt that he was out of place in that station and asked to be transferred to an easier job. Incidentally, he had lost twenty pounds in weight and was worrying about the situation. He was told, "You are taking this too much to heart. You are afraid you are not making good. That has led you to worry. Now forget it. You are doing just as well as any man could

under the circumstances. We are right behind you and approve of all that you have done. Your work is satisfactory; and we are with you. Do not be discouraged. Pitch in and do your best! Six months from now you will laugh at this conversation and of your desire to leave here."

Things started to improve that date. The agent's attitude was better because his worry was removed. He began to think constructively and logically. His men did likewise and due merely to proper mental attitude, the entire operation became more efficient; and as predicted, the agent has never been sorry for his early experience at that station.

Grief and self-condemnation hinder clear thinking. When a man is suffering from the effects of grief over mistakes and is contrite, he is not in fit mental condition to be trustworthy. His mental state is so low from his self-condemnation that he will promise anything for the moment. Statements made by a man when grief stricken cannot be accepted at face value. During investigations, a man is frequently asked if he is not ashamed for making an error, even though made in ignorance. This is really a waste of time. Effort might better be spent in repairing the damage done and in organizing to prevent a similar condition in the future. It is not necessary nor even advisable to make a man condemn himself unduly for his errors. Better results can be obtained by keeping him in a normal frame of mind during any investigation or discipline talk.

A further obstacle to logical thinking is hate. It is hard to be fair when thinking of a man we dislike. Mention is also made of class hatred as incited by some periodicals and agitators.

Then too, there is jealousy. There is no one more unreasonable than a jealous man or woman. They absolutely refuse to listen to reason or see anything in its true light.

Selfishness is one of our most frequent causes for unsound reasoning. We are all selfish and interested in ourselves to some extent, but some men look at questions with such limited experience that we could say they are penny wise and pound foolish.

If then, a man is **not** performing satisfactorily, it is quite likely that one of these considerations is giving him a wrong viewpoint of his job. The duty of the supervising officer is to locate the cause. We know that if his actions are different from the rest, it is because of his mental attitude. If he is prejudiced or cranky, it becomes necessary to put our finger on the sore spot before we can help him overcome the difficulty.

Assume we have had a man failure. Let's proceed with the investigation. Frequently an officer calls a man to his office and starts a series of questions and answers. The officer probably has the idea that the man is guilty and should be punished; the man knows this and is anxious to say as little as possible; but nevertheless to give the best reason for his action, with the idea of escaping severe punishment. Many officers think that it is good policy to be severe and abusive in order to make an impression on the individual. The man feels that the less he says, the better, and so possibly agrees that he is wrong and promises to do better, without really having stated all the facts in the case.

A man's real point of view is not always easily obtained. Men frequently admit that they do not know why they make errors because they are unaware of their own fixed opinions and cranky notions. Only careful questioning, accompanied by intelligent observation will lead to a right diagnosis.

When a man is sick, the doctor locates the trouble and then treats the patient. He does not condemn nor censure him for being sick. When men do not act properly, they are mentally sick or at least slightly indisposed. It is part of our job as leaders to locate the trouble, which we know is in their thinking, before we can correct it. We cannot get best results when we appeal to men only through the fear of punishment because we know that fear handicaps proper thinking and therefore, aggravates and does not help the individual.

Some of you may say, "That sounds allright, but just how can it be done? What is its practical application?" Perhaps an actual case will answer the question.

Henry Smith has been in train service for many years. He was an intelligent, conscientious and steady worker. Nevertheless, he was not liked by the yardmasters, trainmasters, engineers or brakemen. If there was a right way and a wrong way of doing anything, he seemed to pick the wrong way. He seemed to carry out instructions as he thought they should be, yet his interpretation was different from that of the other men. For this reason, it was often thought that his judgment was defective and all considered him stubborn because he insisted upon things being done his way, and argued at length with his associates when they tried to make suggestions. As could be expected, he was repeatedly in trouble with the trainmaster and his discipline book had many records on it. Yet these seemed

to have no permanent effect and it was only a matter of a short time before some other failure would come to light.

Accordingly, he was asked to come to the office for a man-to-man talk. All these various shortcomings were mentioned and he was asked for his version. He could not understand why he was in constant trouble because he thought he used good judgment and felt that every one was down on him and that he was being persecuted and did not know the cause. When anyone spoke to him, he felt they were trying to criticise and so defended his acts and refused to be convinced that he was wrong. At first he felt that this particular talk was simply another bit of persecution. After more than an hour of such conversation in which, however, there was no ill-temper or bad feeling displayed on either side, he began to feel that the officer was really interested in him and was honestly trying to locate the cause of his many failures. Among other things, he was told about the necessity for co-operation between various men on the railroad, and, that sometimes dispatchers were to blame in not giving conductors more leeway in handling difficult situations. This brought forth a hearty response and Smith said that he was glad that it was felt that the dispatchers were sometimes wrong, and he cited several cases wherein delays had been prolonged by the autocratic attitude of dispatchers when the men on the ground could have handled the situation in a better manner.

This of course, was an interesting subject, and upon being encouraged to talk, Smith finally told of a great number of suggestions that he had made to various men without getting any favorable action, with the result that he had come to the conclusion that everyone was down on him and would pay no attention to anything he had to say so he had concluded to do his work in his own way without asking any questions or advice. The more he thought about it, the more bitter he had become, until gradually he felt that he was simply being persecuted.

Of course, this was the answer to his actions and with this opening, it was not difficult to show him how he had built up an antagonistic spirit, that because he had been carrying a "chip on his shoulder," all his associates responded in like manner; and it was not difficult to persuade him that any man in a railroad organization is treated just as he treats others; that other men did not seem to have the same trouble because of their more co-operative attitude; and that if he could forget all these old grudges and face about and decide to be a different sort of individual, to be more cheery in his dealings with other men; to

try to secure the other man's viewpoint; to carefully think of the intent of the instructions which he received and try to carry out the spirit as well as the letter of the law; that he would probably find that those with whom he came in contact would show an entirely different attitude toward him. He readily saw the point and agreed and his services have been satisfactory since that time.

This case illustrates the necessity of carefully analyzing the man's own thoughts and notions if we are to arrive at a correct understanding of his actions and that if we are to change his actions, we must change his thinking as was done in this case.

It is easier to help young than old men, because "it is hard to teach old dogs new tricks," and young men are more easily persuaded to obtain the proper viewpoint to further their own progress. As men grow older, their opinions become more fixed and if predicated on a wrong foundation, they are hard to change.

An old engineer long in the service had an engine failure, which could easily have been repaired at the time had he been aware of the true cause. He, however, assumed the trouble was something else and did not make an effort to repair it. The fireman and other members of the crew did not assist in locating the trouble, taking the engineer's word for the cause, simply because the engineer had never taken kindly to suggestions. In fact, he held aloof from all his associates, and while not antagonistic, at least was not friendly.

An effort was made to find the cause for this and it was found to be in an occurrence of thirty years' standing. He had done an unusual piece of work for which he was never thanked by the officers of the company but which got him into disrepute with some of the other men. The more he thought of it, the more the lack of appreciation preyed on his mind and made him a recluse. He had not realized this at all, but when this was brought to light, he was easily persuaded that he was doing himself an injustice in thinking more of it and that if he could become more co-operative in his attitude toward his associates, they would respond in like manner; his work would be easier and pleasanter and in case of another break down, he would probably have the assistance of the crew. He promised to do his part and has done so.

In this case, the cause of all this man's later actions were traceable to one specific cause; that of lack of appreciation on

the part of the officers, and when this was rectified, the cause of this man's improper thinking was removed.

Too often an investigation is brought to an end when the bare facts have been obtained, and when the man has acknowledged the blame, without any further effort being made to find the real cause. We all know that most of us do not appreciate that we have fixed opinions, or complexes and they are not as apparent to us as they are to others. When a man "on the carpet" finds that the officer is really trying to help rather than to punish, he will co-operate and volunteer much information about his thoughts and opinions. He then becomes interested in analyzing his own thoughts. After he has been made familiar with their influence on his actions and performance and when he finds that his habits of thinking, and his ideas, are affecting his actions and his services; he realizes that it is to his own interest to make these thoughts right. Every man instinctively wants to be well thought of and wants to fit in with his associates and he is just as much interested in performing satisfactorily as we are in having him. And if we can show him why he is not performing satisfactorily, he will be an unusual man if he does not take the information kindly and act upon it.

This then is the remedy for a man failure—find what habits of thinking or notions interfere with his normal actions and then show him their influence on his personality and suggest a change in his mental habits. It must be remembered, however, that before this can be done, the man who conducts the investigation must straighten out his own thinking. He must be able to look at both sides of the question and be able to intelligently interpret by careful observation, as well as by clear thinking, just what unusual thoughts the man has acquired so that he can apply the proper remedy. Failure to locate the real cause is like the time-worn story of repairing the ceiling without also repairing the roof.

In the final analysis, we learn that human relations follow the natural law of cause and effect; and in applying this law to the action of human beings, we have only to realize that in our minds, things are as we think they are and that we act accordingly. We must remember that opinions, not facts, guide our actions.

There is an ever increasing field for this work on our railroads. We realize that rules and standard practice cards are not in themselves sufficient to bring about uniform results. We must go further and see that our men understand the rules and

instructions and the reasons therefore. We cannot control men's actions by dealing with actions alone, but when we have helped them to think clearly, with all which that word implies, then their actions and their service will be all that can be desired.

We have made great strides along mechanical and electrical lines and are gaining the benefits through more efficient operation. We have not reached the limit of material progress, but it is evident that we can now, with profit, direct some of our attention to more intelligent handling of the human element, realizing full well that the greatest influence and factor in efficient operation is the enthusiastic co-operation of every man on the payroll. This again runs true to form. Co-operation is the effect; right mental attitude, brought about by intelligent handling of the human element, is the cause.

PRESIDENT: I had an idea, when I learned that our friend, Mr. Woodruff, was going to talk to us that we would hear something that would be of value. Personally, I have learned something worthwhile. It is customary at the close of the paper, as you all know, to have a discussion of the points of interest that particularly appeal to you. Mr. Woodruff has given us something to think about and I am sure something to discuss. I shall not cail on any one specifically, but I shall expect you to start it promptly.

MR. HENRY F. GILG: The paper is a very interesting study in psychology and Mr. Woodruff has solved a great many of the problems. In my short experience, covering something like fifty years, I have learned that thinking is what makes progress, and with the man that watches the clock the thinking is in inverse ratio to the time he spends watching the clock. If a man will think, as Mr. Woodruff has emphasized in his paper, he will reach the point that has been reached by some of the members of the Club here tonight whom I know are not watchers of clocks.

MR. J. E. HUGHES: I have listened very attentively to the paper tonight, and knowing Mr. Woodruff personally, I have been very much interested in what he has had to say. Having been in this game for at least 25 years, holding investigations from time to time with different employes in the service, particularly train men, it has always been my aim to have the employee under investigation appreciate what the investigation was being held for, and to have him appreciate the responsibility for violation of rules and the results of those violations. I find by spend-

ing considerable time in investigating these features we get better results from the employe after the investigation is held. There have been occasions in my experience where the employee when brought in for investigation, does not have the least idea of the responsibility that is connected with the violation he is charged with. If we as supervisory officers would spend more time with employees trying to impress upon them their responsibility in connection with the violation, I think the time spent would be a benefit to the employe as well as to the employer.

PRESIDENT: I am going to ask Mr. Devens, of the B., R. & P., to say something.

MR. E. J. DEVENS: I thought that was the thing you agreed not to do. I will say this, that I am very glad I was able to be here and listen to this paper. I expected to get something good, but I did not know it would be quite as good as it was. The speaker has done a little too much thinking, in preparing that paper, for me to undertake any criticism of it. I shall not attempt to do that. I feel that the outstanding feature of this paper is that the supervising officer has first got to think right himself before he can expect the other fellow to do so.

PRESIDENT: I see Mr. C. O. Dambach, of the Pittsburgh & West Virginia Railroad. May we hear from him?

MR. C. O. DAMBACH: I am very glad to have been here tonight and have enjoyed the paper very much, but as Mr. Devans has stated, Mr. Woodruff has given this matter too much study to admit of any constructive criticism.

There is one thing which Mr. Woodruff has mentioned that might be elaborated upon, and that is a closer point of contact between the officials and the men, especially on the larger systems.

The man failures, I believe, could also be further reduced by encouraging a friendly spirit of co-operation between the different departments, rather than the method so frequently employed of simply passing the buck.

PRESIDENT: We have here tonight a gentleman who spent a great many years in the railroad game, much of it holding most important positions, and who has had a lot of experience along the line of handling men. He is a past president of this Club. We would like to hear from Mr. D. F. Crawford.

MR. D. F. CRAWFORD: Mr. Woodruff has certainly made a most careful and thorough analysis of the subject which he has presented to us and of course any one who has been associated with men must have profited by the many interesting statements contained in the paper. It has always seemed to me, first, that nearly every one, if not every one, really wants to do the right thing. If he does not do the right thing it is either because he was not instructed properly or he did not understand the instructions. I think we spend entirely too much time investigating, especially as the tendency is to make our investigations long drawn out semi-legal hearings with stenographers present, as Mr. Woodruff has properly stated, this does not bring the man's heart to you. There are three sides to every question, not two, as is usually stated: your side, my side and the facts. The last one is the one that is generally neglected in our dealings with men. I think that much can be accomplished by first explaining to each man what is expected of him—and I do not mean by giving him a primer and starting in at "A," but realizing that he is a grown man and has certain responsibilities and certain duties and these can all be explained to him. I think, perhaps the most important thing for a supervising officer, either on a railroad or in an industry, is to talk to the man next to him in rank and inculcate in him the necessity of transmitting to the next man below the same kind of information Mr. Woodruff has so ably presented to the Club this evening. It is a subject that is intensely interesting. There are many articles being written on it, largely from the viewpoint of the so-called psycho-analysis and some of the articles I have read were evidently written by men who, if they had spent but a few minutes in the practical service of the railroad or industry, it would have given them a very different viewpoint. Mr. Woodruff's viewpoint has been that of a man personally familiar with the subject and therefore I feel it is a most valuable contribution to the Club. And it has been a great pleasure to me to have had the opportunity to hear it.

MR. D. J. REDDING: I feel, as you have expressed it, Mr. President, that we have listened to a very entertaining and educative paper. Mr. Woodruff has said a number of things that perhaps we have known but have not been able to put into words as he has. He has emphasized the fact that we have advanced a long way in railroad work. Most of us can go back to the time when a fellow that started in the railroad work was largely thrown upon his own resources. No matter what de-

partment he was in, he was largely left to himself. There were certain rules laid down but they were very few and not very well known. To a greater or less extent, each man became a law unto himself and if the law was good he got by and if it was not he got fired. But there has been a very material advance in the educational work of railroads. You are training the men in perhaps every branch of the service to do the things they have to do and that you think ought to be done. You have schools for the training of firemen and engineers and mechanical classes and examination on the rules under which they work. And it is well to do that. The man who understands what is expected of him and knows what the rules mean is in much better shape to perform work intelligently and in accordance with the rules than the fellow that just hits the high spots in the printed book of rules and applies them in his own way. I can not help but think, from my own experience and observation of railroading covering a good many years, that we have gone a long way in providing the means by which men can escape this discipline Mr. Woodruff speaks of, which is still necessary and probably always will be, but to a more limited extent as time goes by, and the men employed on railroads are given better training to know just what the details of their job are and how to do them.

If we would all follow the principles laid down by Mr. Woodruff, not only the men in the ranks, but the officers as well, we would have smoother working railroads and less disciplining.

We have all profited by listening to the paper and I would move that we extend to the speaker of the evening a rising vote of thanks in expression of our appreciation.

The motion was seconded and prevailed by unanimous rising vote.

There being no further business, upon motion, adjourned.

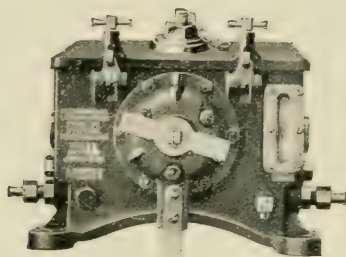
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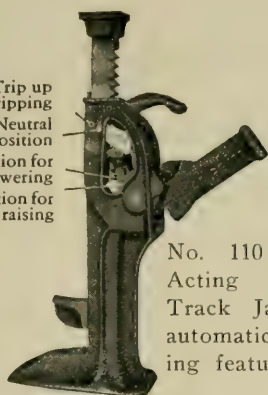
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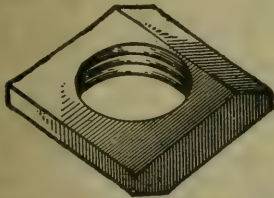
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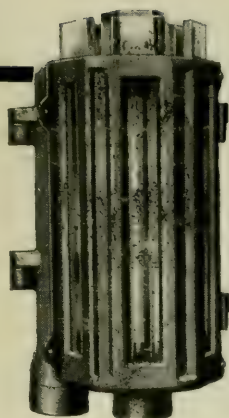
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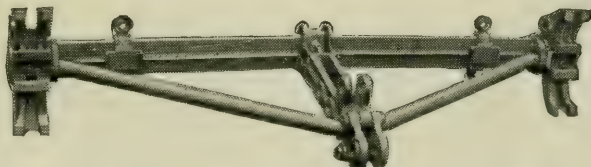
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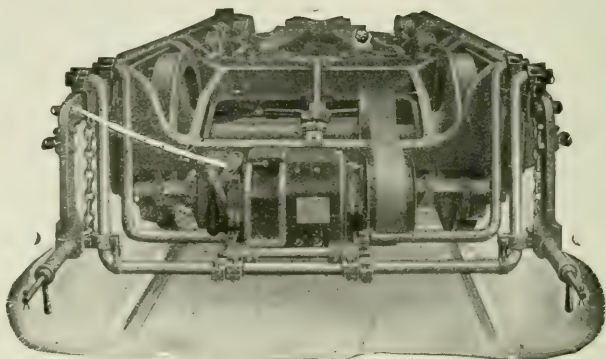
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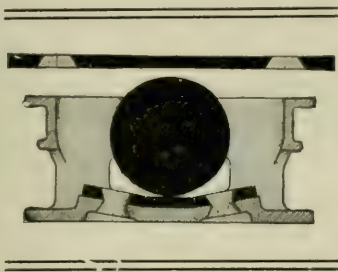
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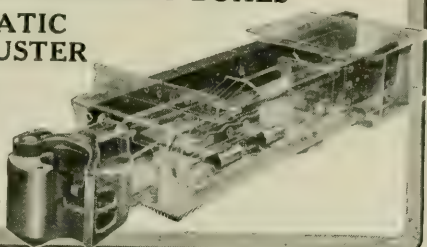
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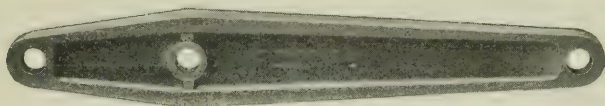
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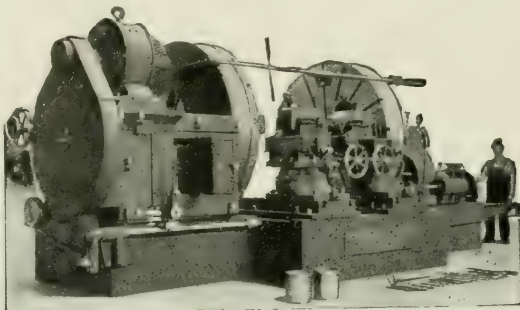
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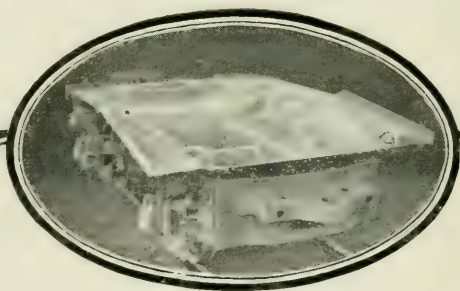
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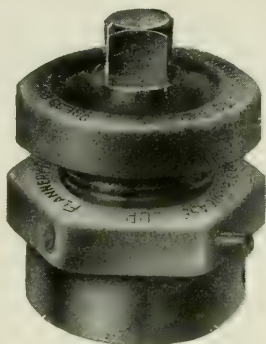
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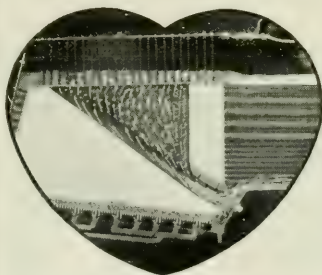
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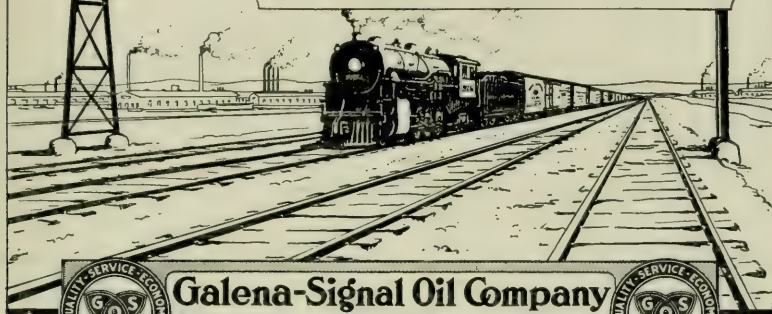
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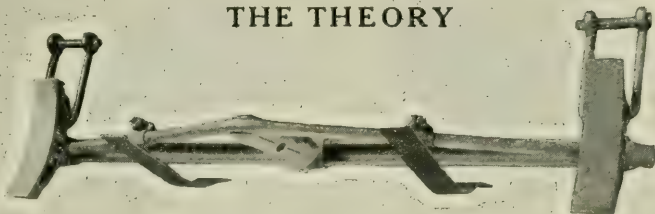
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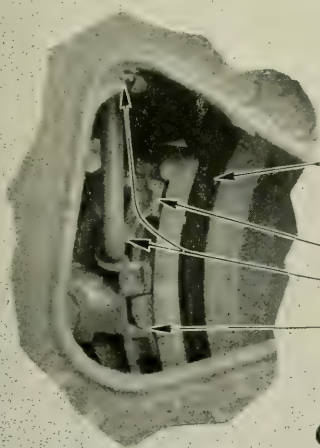




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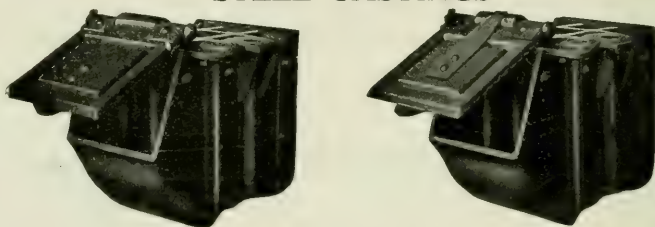


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Organized October 18, 1901

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Pittsburgh, Pa., March 25, 1926.

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GEORGE D. OGDEN.....	November, 1923, to October, 1924
A. STUCKI.....	November, 1924, to October, 1925

*—Deceased.

PROCEEDINGS OF MEETING

March 25, 1926

The meeting was called to order at the Fort Pitt Hotel, Pittsburgh, Pa., at 8:00 o'clock P. M., President Frank G. Minnick in the chair.

The following gentlemen registered:

MEMBERS:

Allen, Harvey	Furch, G. J.
Altsman, W. H.	Gardner, George R.
Anderson, A. E.	Geddes, James R.
Angstadt, Edward D.	Gilg, Henry F.
Ashton, William A.	Givler, H. C.
Babcock, F. H.	Glaser, J. P.
Balzer, C. E.	Goda, P. H.
Barrett, R. L.	Goff, J. P.
Berg, Karl	Gregory, W. H.
Berghane, A. L.	Grieve, Robert E.
Boyle, Edward A.	Guignon, W. E.
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Burk, G. C.	Hale, O. R.
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Champion, James H.	Harris, J. L.
Conlon, John F.	Harter, Arnold
Conway, J. D.	Hoffman, C. T.
Cooper, J. P.	Hogg, Francis
Cotter, George L.	Holmes, E. H.
Courtney, H.	Howe, D. M.
Cramblett, Leonard	Huber, H. G.
Croke, Thomas F.	Hudson, W. L.
Cunningham, R. I.	Hughes, J. E.
Currie, H. J.	Hulick, E. G.
Dambach, C. O.	Hunter, Bernard E.
Damrau, Edward A.	Hyde, W. B.
Davis, Charles S.	John, William
Devans, E. J.	Joyce, Thomas J.
Dierker, R. H. L.	Jungbluth, Adolph
Eagan, D. F.	Kamerer, R. W.
Edwards, C. H.	Karns, C. A.
Emery, C. W.	Kelly, H. B.
Emery, E.	Kelly, J. P.
Endsley, Louis E.	Kessler, H.
Fair, Charles	Ketterer, F. P.
Farrington, A. R.	King, J. W., Jr.
Farrington, R. J.	Kirkpatrick, H. F.
Foster, F. L.	Kroske, J. F.
Freshwater, F. H.	Kummer, Jos. H.
Fults, J. H.	Laird, E. C.

Landefeld, R. H.
 Landis, William C.
 Lehr, Harry W.
 Lewis, Walter M.
 Lingle, C. M.
 Livingston, J. Warner
 Lohr, A. W.
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 Maliphant, C. W.
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 Mann, N. T.
 Miller, George
 Miller, John
 Mills, C. C.
 Minnick, F. G.
 Mitchell, F. K.
 Mitchell, W. S.
 Moore, D. O.
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 McGann, J. F.
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 McManus, Charles
 McNiff, John L.
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 O'Sullivan, John J.
 O'Toole, J. F.
 Painter, Joseph
 Parke, F. H.
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 Prince, Albert
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 Wynn, H. R.
 Wynn, M. E.

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 Teague, O. R.
 Wynn, Charles A.
 Wynn, D. W.
 Young, F. C.

Zitzman, N. E.

PRESIDENT: The Roll Call will be dispensed with, the record of attendance being had from the registration cards.

If there is no objection, the reading of the minutes of the previous meeting will be dispensed with, as they are to appear in printed form.

The Secretary read the following list of applications for membership:

Aaron, C. T., Yardmaster, P. & L. E. R. R., 815 Romine Avenue, McKeesport, Pa. Recommended by C. M. Lingle.

Abbott, J. A., Asst. Trainmaster, Western Maryland Railway, Cumberland, Md. Recommended by J. E. Hughes.

Allen, E. J., Salesman, Ingersoll-Rand Company, 706 Chamber of Commerce Building, Pittsburgh, Pa. Recommended by J. F. Kroske.

Anthony, R. H., Freight Claim Agent, P. & L. E. R. R., 332 South Mathilda Street, Pittsburgh, Pa. Recommended by J. E. Hughes.

Barr, H. C., Agent, P. & L. E. R. R., 127 Virginia Avenue, Pittsburgh, Pa. Recommended by R. W. Kamerer.

- Parr, William R., Yard Clerk, P. & L. E. R. R., Lincoln and Walnut Streets, Versailles, Pa. Recommended by C. M. Lingle.
- Beitzel, H. L., C. C. to Traffic Manager, P. & L. E. R. R., 1328 Rutherford Avenue, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Bevan, P. A., Assistant to Works Manager, Westinghouse Air Brake Company, Wilmerding, Pa. Recommended by G. W. Wildin.
- Bittner, William A., President and Manager, W. A. Bittner Company, 422 First Avenue, Pittsburgh, Pa. Recommended by Edward A. Boyle.
- Brautigam, H. S., Representative, Railroad Department, Allegheny Steel Company, Brackenridge, Pa. Recommended by Harry W. Lehr.
- Brennen, Charles H., Yard Clerk, P. & L. E. R. R., 4016 Coleman Street, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Brinkhoff, W. H., Draftsman, P. & L. E. R. R., 13 Willow Street, Emsworth, Pa. Recommended by T. F. Sheridan.
- Brown, F. A., Chief Clerk, Freight Claim Office, P. & L. E. R. R., 87 South Sixteenth Street, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Brueckner, Anthony J., Gang Foreman, Pennsylvania Railroad System, 1610 Lowrie Street, Pittsburgh, Pa. Recommended by Harry W. Lehr.
- Burdoft, John M., General Yardmaster, B. & O. R. R., Smithfield and Water Street Station, Pittsburgh, Pa. Recommended by J. T. Campbell.
- Button, D. G., Yardmaster, P. & L. E. R. R., Dickerson Run, Pa. Recommended by J. E. Hughes.
- Callahan, Lawrence H., Yardmaster, P. & L. E. R. R., 600 Monongahela Avenue, McKeesport, Pa. Recommended by J. E. Hughes.
- Campbell, James E., Agent, P. & L. E. R. R., 512 Twelfth Avenue, Munhall, Pa. Recommended by J. E. Hughes.
- Clements, Frank C., Foreman, P. & L. E. R. R., 844 Island Avenue, McKees Rocks, Pa. Recommended by R. J. Farrington.

- Ciunan, Patrick F., Chief Waybill Clerk, P. & L. E. R. R.,
P. & L. E. Annex Building, Pittsburgh, Pa. Recommended
by R. W. Kamerer.
- Connolly, E. V., Chief Clerk and Cashier, P. & L. E. R. R.,
Rankin, Pa. Recommended by J. E. Hughes.
- Coughenour, H. A., City Freight Agent, New York Central R.
R., 364 Union Trust Building, Pittsburgh, Pa. Recom-
mended by J. W. McElravy.
- Culan, John A., Eng. Dispr. R. H., P. & L. E. R. R., 208 Amelia
Street, McKees Rocks, Pa. Recommended by H. B. Kelly.
- Cunningham, W. P., Supt. Motive Power, Monongahela Rail-
way Co., 3169 Ashlyn Street, Pittsburgh, Pa. Recommended
by J. F. Kroske.
- Darr, Elsworth E., Yardmaster, P. & L. E. R. R., 235 Meridan
Street, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Deckenbaugh, Andrew L., Chief Clerk of Accounts, P. & L. E.
R. R., Room 25 P. & L. E. Annex Building, Pittsburgh, Pa.
Recommended by R. W. Kamerer.
- Dipper, Fred W., Cashier, P. & L. E. R. R., 2618 Church Ave-
nue, Mt. Oliver Station, Pittsburgh, Pa. Recommended by
R. W. Kamerer.
- Donaldson, Charles E., General Yardmaster, P. & L. E. R. R.,
8 East Laurell Avenue, New Castle, Pa. Recommended by
H. B. Kelly.
- Doran, F. E., Lead Clerk, Pennsylvania Railroad System, 16
Colonial Annex, Wilkinsburg, Pa. Recommended by Harry
W. Lehr.
- Drumheller, C. R., Agent, P. & L. E. R. R., 731 George Street,
Coraopolis, Pa. Recommended by H. B. Kelly.
- Eader, Lewis M., C. C. Inbound Revision Office, P. & L. E.
R. R., 343 Bailey Avenue, Pittsburgh, Pa. Recommended
by R. W. Kamerer.
- Edwards, H. F., R. F. of E., Monongahela Railway, 1027 Sec-
ond Street, South Brownsville, Pa. Recommended by J.
F. Kroske.
- Evans, W. J., Chief Clerk-Terminal Agent, P. & L. E. R. R.,
No. 21 P. & L. E. Annex Building, Pittsburgh, Pa. Recom-
mended by R. W. Kamerer.

- Ferrick, John T., Freight Cashier, P. & L. E. R. R., Terminal Annex, Pittsburgh, Pa. Recommended by R. W. Kameron.
- Fisher, E. M., Asst. R. F. of E., Pennsylvania Railroad System, 909 East Washington Street, New Castle, Pa. Recommended by C. T. Hoffman.
- Forbes, W. R., Local Traffic Manager, Page Steel & Wire Company, Monessen, Pa. Recommended by J. E. Hughes.
- Frankenberry, J. G., Conductor, P. & L. E. R. R., 414 North Cottage Avenue, Connellsville, Pa. Recommended by J. E. Hughes.
- Frey, W. H., Freight Ticket Agent, P. & L. E. R. R., Braddock, Pa. Recommended by J. E. Hughes.
- Fritzky, Vincent, Gang Foreman, Pennsylvania Railroad System, 2864 Sanborn Street, Pittsburgh, Pa. Recommended by Harry W. Lehr.
- Froelich, R. J., Chief Clerk, N. Y. C. R. R., 364 Union Trust Building, Pittsburgh, Pa. Recommended by J. W. McElravy.
- Gallupe, Robert G., General Foreman, P. & L. E. R. R., No. 11 P. & L. E. Annex Building, Pittsburgh, Pa. Recommended by R. W. Kameron.
- Gilbert, Oliver L., Sales Agent, Sattley & Gilbert, 604 Chamber of Commerce Building, Pittsburgh, Pa. Recommended by E. C. Sattley.
- Glaser, J. P., Auditor Disbursements, P. & L. E. R. R., 909 Bellaire Avenue, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Grannis, O. R., Shipping Clerk, McClintic-Marshall Construction Company, Rankin, Pa. Recommended by J. E. Hughes.
- Grounds, W. H., Traveling Freight Agent, N. Y. C. R. R., 364 Union Trust Building, Pittsburgh, Pa. Recommended by J. W. McElravy.
- Haas, W. H., Sales Representative, Pyle-National Company, 1334 North Kostner Avenue, Chicago, Ill. Recommended by William Penn.
- Haller, Nelson M., Storekeeper, P. & L. E. R. R., 5853 Aylesboro Avenue, Pittsburgh, Pa. Recommended by L. Sutherland.

- Harrison, E. H., Trainmaster, Western Maryland Railway, Cumberland, Md. Recommended by J. E. Hughes.
- Hanna, R. B., C. C. to Superintendent, P. & L. E. R. R., No. 132 P. & L. E. Annex Building, Pittsburgh, Pa. Recommended by F. M. Brown.
- Hayden, William F., Foreman, P. & L. E. R. R., 121 Roscoe Street, Mt. Oliver Station, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Hendrix, Wallace, Engineer, P. & L. E. R. R., 1128 Wayne Avenue, McKees Rocks, Pa. Recommended by John J. O'Sullivan.
- Herald, M. A., President, United Car & Equipment Company, Westinghouse Building, Pittsburgh, Pa. Recommended by J. A. Ralston and Robert Rogers.
- Hervey, R. S., Auditor Freight Accounts, P. & L. E. R. R., 723 Main Street, Coraopolis, Pa. Recommended by J. E. Hughes.
- Heston, E. L., Foreman, Pennsylvania Railroad System, 7233 Mt. Vernon Street, Pittsburgh, Pa. Recommended by Harry W. Lehr.
- Hollis, Arthur, Asst. C. C. Terminal Agents Office, P. & L. E. R. R., 733 Fordham Avenue, Pittsburgh, Pa. Recommended by R. W. Kamerer.
- Irwin, G. H., Freight Inspector, Trunk Line Freight Inspection Bureau, 5463 Black Street, E. E. Pittsburgh, Pa. Recommended by R. W. Kamerer.
- Jacobs, William H., Crew Dispatcher, P. & L. E. R. R., Dickerson Run, Pa. Recommended by J. E. Hughes.
- John, William, Asst. Auditor Freight Accounts, P. & L. E. R. R., 312 Laurel Street, Edgewood, Pa. Recommended by J. E. Hughes.
- Kennedy, A. R., Traffic Manager, Pittsburgh Steel Company, Room No. 700 Union Trust Building, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Kennedy, F. J., Auditor Passenger Accounts, P. & L. E. R. R., 802 Fifth Street, New Brighton, Pa. Recommended by J. E. Hughes.
- Kennedy, Joseph D., Chief Lineman, P. & W. Va. R. R., 466 South Trenton Avenue, Wilkinsburg, Pa. Recommended by R. L. Barrett.

- Kimling, Karl, Asst. Mgr., Central Warehouse, P. & L. E. R. R., 85 Harwood Street, Pittsburgh, Pa. Recommended by R. W. Kamerer.
- Kimling, W. C., C. C. to Freight Agent, P. & L. E. R. R., 518 Atlantic Avenue, McKeesport, Pa. Recommended by J. W. McElravy.
- King, C. H., General Agent, N. Y. C. R. R., 361 Union Trust Building, Pittsburgh, Pa. Recommended by J. W. McElravy.
- Klue, Henry, Wreck Master, P. & L. E. R. R., 1022 Chartiers Avenue, McKees Rocks, Pa. Recommended by H. B. Kelly.
- Koch, P. R., Station Master, P. & L. E. R. R., Pittsburgh, Pa. Recommended by J. E. Hughes.
- Leck, A. H., C. C. to Suprs., P. & L. E. R. R., 628 Woodward Avenue, McKees Rocks, Pa. Recommended by H. B. Kelly.
- Leck, G. F., Mach. Appr., P. & L. E. R. R., 725 Bouquet Street, McKees Rocks, Pa. Recommended by W. H. Gregory.
- Lee, Claude J., Asst. E. H. F., Pennsylvania Railroad System, 98 McKinley Avenue, Emsworth, Pa. Recommended by C. T. Hoffman.
- Letters, Alex J., General Foreman, P. & L. E. R. R., 177 Steuben Avenue, Crafton, Pa. Recommended by R. W. Kamerer.
- Lewis, Walter M., Gang Foreman, Pennsylvania Railroad System, 172 Olympia Street, Pittsburgh, Pa. Recommended by Harry W. Lehr.
- Lloyd, D. W., Asst. to Gen. Manager, Westinghouse Air Brake Company, Wilmerding, Pa. Recommended by G. W. Wildin.
- Lyon, J. L., Salesman, The Celotex Company, 207 Fulton Building, Pittsburgh, Pa. Recommended by D. M. Howe.
- MacGregor, Rob Roy, Draftsman, P. & L. E. R. R., 1300 Hillsdale Avenue, Dormont, Pittsburgh, Pa. Recommended by H. Courtney.
- Martyn, Vincent S., Claim Agent, P. & L. E. R. R., 502 Coursin Street, McKeesport, Pa. Recommended by J. E. Hughes.

- Megogney, Frank M., Statistician, P. & L. E. R. R., No. 621
P. & L. E. Annex Building, Pittsburgh, Pa. Recommended
by F. L. Foster.
- Moore, Ray L., Asst. Superintendent, B. R. & P. Ry., Punxsu-
tawney, Pa. Recommended by E. J. Devans.
- Murphy, Martin, G. Y. M., P. & L. E. R. R., 316 Jucunda Street,
Knoxville, Pa. Recommended by J. E. Hughes.
- McCann, B. V., City Freight Agent, N. Y. C. R. R., 364 Union
Trust Building, Pittsburgh, Pa. Recommended by J. W.
McElravy.
- McConnell, Frank P., Yardmaster, P. & L. E. R. R., 127 Stew-
art Street, Pittsburgh, Pa. Recommended by J. E. Hughes.
- McCune, J. C., Asst. Director of Engineering, Westinghouse Air
Brake Company, Wilmerding, Pa. Recommended by G. W.
Wildin.
- McDonald, Joseph N., Machinist, P. & L. E. R. R., 517 West
End Avenue, Coraopolis, Pa. Recommended by R. Lande-
feld.
- McGrath, Sherman C., Yardmaster, P. & L. E. R. R., P. O. Box
No. 371, Coraopolis, Pa. Recommended by J. A. Brice.
- McIlwain, J. P., Freight Agent, P. & L. E. R. R., 45 Greenbush
Street, Pittsburgh, Pa. Recommended by J. E. Hughes.
- McManus, Charles J., Gang Foreman, Pennsylvania Railroad
System, 3628 Liberty Avenue, Pittsburgh, Pa. Recom-
mended by Harry W. Lehr.
- McMillan, F. C., Chief Train Dispatcher, P. & L. E. R. R., 420
Kathleen Street, Pittsburgh, Pa. Recommended by J. E.
Hughes.
- McMurray, Arthur E., Chief Statistician, P. & L. E. R. R.,
Pittsburgh, Pa. Recommended by J. L. O'Toole.
- McNelly, A. P., Car Distributor, P. & L. E. R. R., 2950 Voelkel
Avenue, Dormont, Pa. Recommended by Frederick P.
Ketterer.
- McVay, W. H., Rate Clerk, P. & L. E. R. R., 446 Wyola Street,
Pittsburgh, Pa. Recommended by J. E. Hughes.
- Obley, Ralph E., Rate Clerk, P. & L. E. R. R., 1516 Evans
Street, McKeesport, Pa. Recommended by J. E. Hughes.

- Orr, H. A., Car Record Clerk, P. & L. E. R. R., No. 11 Terminal Annex Buildings, Pittsburgh, Pa. Recommended by R. W. Kamerer.
- Osborne, H. C., Supvr. of Water Supply, P. & L. E. R. R., 481 Fair Avenue, Beaver, Pa. Recommended by H. B. Kelly.
- Pare, Albert M., Asst. Chief Revision Clerk, P. & L. E. R. R., 2925 Sacramento Street, Corliss Station, Pittsburgh, Pa. Recommended by R. W. Kamerer.
- Parker, William, Jr., Asst. Master Mechanic, Pennsylvania R. R. System, 7215 Perrysville Ave., Ben Avon, Pa. Recommended by C. T. Hoffman.
- Patton, H. J., Eng. Dispr. R. H., P. & L. E. R. R., P. O. Box 511, McKees Rocks, Pa. Recommended by H. B. Kelly.
- Penrod, Homer F., Yardmaster, P. & L. E. R. R., 231 South Ninth Street, Connellsville, Pa. Recommended by H. B. McLaughlin.
- Peterson, William, Yardmaster, P. & L. E. R. R., 1404 Pirl Street, McKeesport, Pa. Recommended by C. M. Lingle.
- Pfrom, E. L., Asst. Supvr. of Track, P. & L. E. R. R., 745 Mary Street, McKees Rocks, Pa. Recommended by H. B. Kelly.
- Phillips, C. W., Traveling Engineer, Monongahela Railway, Box 98 West Brownsville, Pa. Recommended by J. F. Kroske.
- Tringle, Arthur D., Supvr. Wage Schedule, Monongahela Railway, South Brownsville, Pa. Recommended by J. E. Hughes.
- Read, Harry J., Asst. Cashier, P. & L. E. R. R., 80 Wyoming Street, Pittsburgh, Pa. Recommended by R. W. Kamerer.
- Reckley, Alfred P., C. C. to Chief Dispatcher, P. & L. E. R. R., 102 P. & L. E. Annex Building, Pittsburgh, Pa. Recommended by Frederick P. Ketterer.
- Redding, James R., Yardmaster, P. & L. E. R. R., 343 Kam-bach Street, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Robbins, John A., C. C. to G. Y. M., P. & L. E. R. R., 205 Star Way, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Robertson, Harold, Chief Clerk, P. & L. E. R. R., Dickerson Run, Pa. Recommended by J. E. Hughes.
- Rodgers, Donald J., Cashier, P. & L. E. R. R., 828 Beech Avenue, Pittsburgh, Pa. Recommended by R. W. Kamerer.

- Rollings, J. E., Agent, P. & L. E. R. R., Dickerson Run, Pa.
Recommended by J. E. Hughes.
- Rushneck, George L., Draftsman, P. & L. E. R. R., No. 41
P. & L. E. Annex Building, Pittsburgh, Pa. Recommended
by Harry Courtney.
- Rushton, A. F., Yardmaster, P. & L. E. R. R., Dawson, Pa.
Recommended by J. E. Hughes.
- Sauer, George L., Freight Agent, P. & L. E. R. R., Second
Street, Monessen, Pa. Recommended by J. E. Hughes.
- Schelat, A. L., Rate Clerk, P. & L. E. R. R., Magee Avenue,
Lincoln Place, Pa. Recommended by J. E. Hughes.
- Schmidt, E. M., Yardmaster, P. & L. E. R. R., 328 Miller Street,
Knoxville, Pa. Recommended by J. E. Hughes.
- Schultz, Harry P., General Yardmaster, P. & L. E. R. R., 2714
Fifth Avenue, Beaver Falls, Pa. Recommended by J. E.
Hughes.
- Seiger, Hillard J., Yardmaster, P. & L. E. R. R., 183 St. Joseph
Street, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Showalter, Joseph, Boilermaker Foreman, Aliquippa & Southern
R. R., 116 Carrol Street, Woodlawn, Pa. Recommended by
W. F. Ambrose.
- Siemon, Edward J., Chief Clerk, Pittsburgh Steel Company, P.
O. Box No. 72, Pittsburgh, Pa. Recommended by J. E.
Hughes.
- Simons, Philip, Traffic Manager, Copperweld Steel Company,
Rankin, Pa. Recommended by J. E. Hughes.
- Smith, Alan Wood, Sales Manager, Standard Engineering Com-
pany, 11 Thorn Street, Sewickley, Pa. Recommended by
J. E. Hughes.
- Smith, F. C., Chief Clerk to Supt., P. & L. E. R. R., Room No.
132, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Smith, Ralph, Yardmaster, P. & L. E. R. R., 605 Warrington
Avenue, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Smith, William C., Yardmaster, P. & L. E. R. R., 406 Arctic
Avenue, McKeesport, Pa. Recommended by C. M. Lingle.
- Stebler, W. J., Traffic Manager, Conley Tank Car Company,
Oliver Building, Pittsburgh, Pa. Recommended by Frank
J. Lanahan.

- Stevenson, W., Asst. R. H. Foreman, P. & L. E. R. R., 615 Nineteenth Street, Beaver Falls, Pa. Recommended by H. B. Kelly.
- Stewart, John M., Asst. C. C. to Supt., P. & L. E. R. R., R. D. No. 1, Vernoia, Pa. Recommended by J. E. Hughes.
- Stiles, Lawson A., Baggage Agent, P. & L. E. R. R., 110 Ulysses Street, Pittsburgh, Pa., Recommended by J. E. Hughes.
- Stine, D. H., Asst. R. F. of E., Pennsylvania Railroad System (Allegheny Shops), Pittsburgh, Pa. Recommended by C. T. Hoffman.
- Stoecker, P. J., Car Tracer, Pittsburgh Steel Company, 700 Union Trust Building, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Stone, W. A., Freight Agent, P. & L. E. R. R., 317 Boyles Avenue, New Castle, Pa. Recommended by H. B. Kelly.
- Swanson, Carl A., C. C. to Asst. Gen. Mgr., P. & L. E. R. R., 320 Connecticut Avenue, Rochester, Pa. Recommended by F. G. Minnick.
- Sweeney, Edward J., Rate Clerk, N. Y. C. R. R., 364 Union Trust Building, Pittsburgh, Pa. Recommended by J. W. McElravy.
- Sylvester, H. C., Manager Central Warehouse, P. & L. E. R. R., 311 Bigham Street, Pittsburgh, Pa. Recommended by R. W. Kamerer.
- Thomas, D. J., Passenger Clerk, P. & L. E. R. R., Room No. 327, Pittsburgh, Pa. Recommended by H. R. Richardson.
- Umbarger, E. R., Traveling Yardmaster, P. & L. E. R. R., West Newton, Pa. Recommended by J. E. Hughes.
- Villee, R. E., Asst. General Foreman, P. & L. E. R. R., 88 Wyoming Street, Pittsburgh, Pa. Recommended by R. W. Kamerer.
- Warner, Russell H., Asst. to Trainmaster, Aliquippa & Southern R. R., 2525 West Liberty Avenue, Dormont, Pittsburgh, Pa. Recommended by C. D. O'Connor.
- Weber, Lawrence L., Chief Rate Clerk, Pittsburgh Steel Company, 700 Union Trust Building, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Weckerle, W. J., General Yardmaster, P. & L. E. R. R., Dickerson Run, Pa. Recommended by J. E. Hughes.

- Weltz, Edward E., Chief Clerk, P. & L. E. R. R., 122 South Nineteenth Street, Pittsburgh, Pa. Recommended by R. W. Kameron.
- Whipkey, Daniel L., Relief Yardmaster, P. & L. E. R. R., Dawson, Pa. Recommended by J. E. Hughes.
- Wilcox, H. C., Editorial Representative, Railway Age, 6007 Euclid Avenue, Cleveland, Ohio. Recommended by J. D. Conway.
- Woods, Joseph, Statistician, P. & L. E. R. R., 5124 Baum Boulevard, Pittsburgh, Pa. Recommended by F. L. Foster.
- Wynn, C. A., Conductor, Union Railroad, 1518 Foliage Street, Wilksburg, Pa. Recommended by E. M. Wynn.
- Wynn, D. W., Draftsman, Harbison-Walker Refractories Company, 4831 Blair Street, Hazelwood, Pittsburgh, Pa. Recommended by E. M. Wynn.
- Zimmerlink, Martin, Yardmaster, P. & L. E. R. R., 409 Erie Street, McKeesport, Pa. Recommended by C. M. Lingle.
- Zirckel, Arthur H., Asst. Traffic Manager, Pittsburgh Steel Company, 700 Union Trust Building, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Zitzman, N. E., Asst. Chief Clerk, P. & L. E. R. R., No. 612 P. & L. E. Annex Building, Pittsburgh, Pa. Recommended by F. L. Foster.
- Zollars, W. L., Freight and Ticket Agent, P. & L. E. R. R., 326 South Eighth Street, Connellsville, Pa. Recommended by J. E. Hughes.

PRESIDENT: These applications will be referred to the Executive Committee in due course, and upon approval by them the gentlemen will become members without further action than the payment of the current year's dues.

MR. GEO. W. WILDIN: Mr. President, may I have an opportunity to make a suggestion or two?

PRESIDENT: Surely.

MR. WILDIN: Mr. President, I want to make the suggestion,—I understand that the Pittsburgh & Lake Erie have quite a police department, but I haven't heard any names mentioned from that department. We have about every other department on the Pittsburgh & Lake Erie represented. Why

not the police department? The second suggestion is that the Executive Committee of this Club give serious thought to the question of making a change in the name of the Club from the Railway Club of Pittsburgh to the Pittsburgh & Lake Railroad Club; it is a misnomer to carry it along any further under the name of the Railway Club of Pittsburgh. The Pittsburgh & Lake Erie is in the majority.

MEMBER: Mr. Chairman, there are quite a number of strangers here from out of town, and they would like to see what J. E. Hughes looks like.

PRESIDENT: I am sorry, but I don't believe that J. E. Hughes is in the room. He told me that he could not get here tonight. That only points out the value of organization. I happen to be President of the Railway Club and also an officer of the Pittsburgh & Lake Erie, and the whip was cracked, and you see the result.

I want to say that I appreciate very much, not only the effort put forth by the Pittsburgh & Lake Erie boys, but by the representatives of the other industries and railroads, and I appreciate the interest that has been shown in all of your efforts in getting new members. I think you will agree that that is the thing that will make the Railway Club grow and prosper, and I do not know where to go or where to send anyone to get more or as much for his three dollars as he would get by joining the Railway Club of Pittsburgh. I do not believe that any man that will join this club and attend its sessions and listen to the high order of papers that are presented can go away feeling that he has not obtained direct and real benefit and I am going to ask or rather repeat what I asked a month ago—we had last month, I do not know how many now—something over twelve hundred members, and the request was made last month that each of you take an interest in your club to the extent of bringing in one new member each, which would double your membership and make for a larger, more prosperous, more powerful Club, and while you are doing that, you are helping your friend, in that you are directing him to an organization that can help him and will help him through the medium of the excellent papers that our Subject Committee is getting for us.

SECRETARY: At this time it is my duty to announce to the members the deaths that may have taken place that we have been informed of. I know a great many present tonight

will know the name that I will announce of one of the members of this Club, one of our oldest members. If I recollect correctly, he joined our Club in October, 1901, one of the first members. Mr. Daniel M. Brady, of New York City, died February 23, 1926.

PRESIDENT: It is particularly gratifying to know that we have with us tonight a considerable part at least of the Committee representing the Mechanical Division No. 5 of the A. R. A., who are here carrying on a conference with respect to A. R. A. Loading Rules, and also I believe the full Committee of the Signal Section of the A. R. A. We are very glad to have you with us, gentlemen, and we hope the paper will be of interest and that you will take a hearty part in the discussion following the speaker.

With respect to the dance that will be given on the seventh of April, I want to impress upon you the fact that if there are any who desire extra invitations for friends, they can be obtained from Secretary Conway of the Club, by simply telephoning him or dropping him a line, and we want all of your friends that you want here, we want them taken care of. Do not be backward.

With respect to the extra ladies, there seems to be some misunderstanding. I tried to make it clear a month ago, and I want to repeat it, you may find where in some home a man and his wife may have a lady visiting—they may have an extra daughter or a lady member of the family or some friend that they would like to bring along. That will be perfectly agreeable and permissible without extra charge; please understand we will be glad to have the extra ladies present.

I don't know of any subject that is of any more interest to railway men generally and to the people of this country as a whole than the subject of railroad signals and railroad train operation. It is something that is vital to all of us. I don't know of any person who is better fitted and better qualified to intelligently discuss the subject that you are to listen to tonight than the speaker that we have with us. That is because of his extended and varied experience in the line of work on which he proposes to talk tonight, and I am sure we are in for quite a treat.

The subject is that of "Train Operation by Signal Indication," and it will be presented to you by Henry M. Sperry, Consulting Signal Engineer, New York City.

I have had opportunity in the last two or three months to

talk with Mr. Sperry on the subject so far as it pertained to the Pittsburgh & Lake Erie Railroad. I obtained some very valuable information, some real help, and I know that you are going to be interested. I hope you will give him close attention, and at the close of his paper let us have a liberal discussion of his paper. It affords me great pleasure to introduce to you Mr. Henry M. Sperry, the speaker of the evening. (Applause.)

TRAIN OPERATION BY SIGNAL INDICATION

By **MR. H. M. SPERRY**, Consulting Signal Engineer, New York, N. Y.

Transportation is the carriage of persons and commodities from one place to another. Transportation, as we have it today, adds strength to the word "United" as it helps to bind together the forty-eight states of this country of ours into one great nation, the United States of America.

This thought of national unity was written into the name of our first transcontinental railway—the Union Pacific. Without adequate transportation the fruits of our soil and the products of our factories would be of little value except as they could be used locally, and there could be nothing worthy of the name of interstate commerce.

If I seem to give too much credit to transportation for our present-day condition of greatness as a nation, think back to the early days of rail transportation and look at this poster of 1837 of the "Pioneer Fast Line from Philadelphia to Pittsburgh through in three and one-half days." That trip of eighty-four hours was made at an average speed of four miles an hour. At present-day speed our railroads have brought the Pacific Coast as close to Pittsburgh as was Philadelphia ninety years ago.

Transportation is of four kinds, by highway, by water, by rail, and by air. Of these, transportation by rail ranks first in importance as it provides the great arteries over which the major part of our commodities are moved.

The Department of Commerce, in its last annual report, makes the following statement as to the efficiency of rail transportation.

"One of the most important contributions to the elimination of national waste has been the remarkable improvement in

railway transportation during the past five years. The first factor in that improvement was the provision of adequate transportation itself. * * *

"Some very important economic effects have resulted from full, prompt and reliable delivery of goods. The necessity of carrying large stocks as a protection against transportation failure has largely disappeared and in consequence the capital re-

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From PITTSBURGH to LOUISVILLE.



Starts every morning, from the corner of Broad & Race St.

In large and splendid eight wheel coaches, via the Lancaster and Harrisburg Rail Roads, arriving at the latter place at 1 o'clock, in the afternoon, where passengers will take the Packets, which have all been fitted up in a very superior manner, having been built expressly for the accommodation of Passengers, after the most approved models of Boats used on the Erie Canal, and are not surpassed by the Boats used upon any other Line.

The Boats are commanded by old and experienced Captains, several of whom have been connected with the Line for the two last seasons. For speed and comfort, this Line is not excelled by any other in the United States.

Passengers for Cincinnati, Louisville, Natchez, Nashville, St. Louis, &c.

Will always be certain of being taken on without delay, as this Line connects with the Boats at Pittsburgh, carrying the Mail.

OFFICE, N. E. CORNER OF FOURTH AND CHESNUT ST.

For freight or passage, apply at No. 200 Market Street, at the White Swan Hotel, Race Street, at the N. E. Corner of Third and Walnut Streets, No. 41 South Third Street, and at the West Chester House, Broad Street.

Philadelphia, April, 1837

J. B. CUMMINGS, Agent.

Poster advertising "Pioneer Fast Line" from Philadelphia to Pittsburgh, issued April, 1837.

quired in the Nation's distribution has been considerably reduced."

The major elements in the physical organization of a railroad are its way, structures, and equipment. These are the facilities upon and by which transportation is produced in units of ton miles and passenger miles. These units of transportation are the direct product of train miles—the principal unit of work. The efficiency of transportation depends primarily upon the efficiency of train operation. The efficiency of train operation, in turn, depends upon several factors. Among the more important of these factors are adequate and properly maintained trackage and terminals, suitably designed and properly maintained locomotives and cars, and a system of directing train movement that will insure the maximum utilization of track and equipment capacity and the maximum output of train miles in a unit of time. The prime purpose of a system of train direction is to keep trains in motion. A train is a unit of expense, whether moving or standing still. While the train is moving it is producing revenue; while it is standing it is producing nothing to offset its constant expense.

This paper is to deal primarily with the relation between modern signaling and train service efficiency under present-day conditions. Inasmuch, however, as present practice is the result of nearly a century of evolution, some attention will be given to the outstanding historical facts connected with the development of train movement direction. These methods from the beginning of steam transportation have been based upon one or the other or both of two definite principles—first the time interval, and second the space interval. In the earlier days general practice favored the time interval but under modern conditions the space interval under signal indication is universally recognized as the method which insures the maximum of train protection with the minimum of train delay, risk and expense.

With the time interval method train movements are directed by time tables, train orders, and train dispatching. Prior to the electric telegraph the time table was the sole authority for train movements and serious delays were often unavoidable. The Morse electric telegraph came into use in 1844 and seven years later it was first used in train operation for the sending of train orders.

With the first train order came telegraphic train dispatching which offered an effective means for reducing the delays incident to operation under time tables. Time tables make no

provision for the prompt movement of delayed trains or for the running of extra trains. The following description of the first train order, from Mott's History of the Erie Railroad, shows how train dispatching came into use.

"To Charles Minot belongs the honor of having made the first practical application of the Morse telegraph to railroading, either in this or any other country, when, in the early Autumn of 1851 he successfully ran a train by a telegraph order, for a distance of 14 miles on the Erie Railroad.

"From this humble beginning there has been developed a system (train dispatching) that was universally adopted by railroads, not only in the United States, but throughout the world.

* * * *

"Up to the time of Minot's initial experiment with telegraphic train orders, railroad trains were run on what was called the 'time interval system.' The practice was that a ruling train had right of one hour against the opposing train of the same class.

"W. H. Stewart was running the westbound express train on the day when General Superintendent Minot happened to be going over the road on that train which, under the rule then existing, must wait for an eastbound express to pass it at Turner, 47 miles from New York. That train had not arrived, and the west bound train could not proceed until an hour had expired, unless the tardy eastbound train arrived in the meantime. There was a telegraph office at Turner and General Superintendent Minot telegraphed to the operator at Goshen, 14 miles further on, and asked him whether the eastbound train had left the station. The reply was that the train had not yet arrived. Superintendent Minot then telegraphed as follows:

"To Agent and Operator at Goshen:

Hold the train for further orders.

Chas. Minot, Superintendent."

He then wrote this order and handed it to Conductor Stewart:

"To Conductor and Engineer Day Express:

Run to Goshen regardless of opposing train

Chas. Minot, Superintendent."

"'I took the order,' said Mr. Stewart, 'showed it to the engineer, Isaac Lewis, and told him to go ahead. The surprised engineer read the order, and, handing it back to me, exclaimed:

"'Do you take me for a d—d fool? I won't run by that thing!'

"'I reported to Superintendent Minot, who went forward

and used his verbal authority on the engineer, but without effect. Minot then climbed into the engine and took charge of it himself. Engineer Lewis jumped off and got in the rear seat of the last car. The Superintendent ran the train to Goshen. The eastbound train had not yet arrived. He telegraphed to Middletown. The train had not arrived there. The westbound train was then run on a similar order to Middletown, and from there to Port Jervis, where it entered the yard from the east just as the other train came into it from the west.

"An hour and more in time had been saved to the westbound train, and the question of running trains on the Erie by telegraph was at once and forever settled."

Superintendent Minot was our first train dispatcher. Today there is a force of 5,400 train dispatchers and in addition, 59,600 other employes wholly or partially employed in supervising and directing the movement of trains. The total wages in 1925 were \$122,000,000.

Two forms of train orders are in use, form 31 and form 19. The rules require that form 31 shall be receipted for in writing by the conductor of the train addressed. Form 19 is receipted for by the station operator, who is held responsible for the delivery of the order to the conductor and engineman of the train addressed.

Because of this difference in delivery, a moving train is required to stop for a "31" order, but need only slacken speed for a "19" order. If the order should authorize the train to continue its journey, then the delivery of the "31" order, requiring the train to stop, causes a useless delay that might have been avoided by the use of the "19" order.

Today there is an increasing tendency toward a greater use of the "19" train order to eliminate train stops and thus save time and coal. Keeping trains moving increases the output of train miles per train hour.

When Superintendent Minot, in his effort to keep trains moving, issued his first train order he probably did not dream of the magnitude of the effort that must be made today. It is estimated that no less than 130,000 train orders are issued daily, or a total of over 47,000,000 orders a year. As practically all train orders are issued in duplicate, the total number delivered to trains is nearly 95,000,000 orders. This is a conservative figure as sometimes even three or more copies of an order are made.

With the space interval method, train movements are di-

rected, as in the time interval method, by time tables, train orders, and train dispatching, and in addition by block signals.

Block signals are for the purpose of reducing the hazards of train operation by maintaining a space interval between trains. Space between trains spells safety from collision.

In the time interval method, the effort to maintain a space interval by requiring trains to run at least five or ten minutes apart, too often fails of its purpose. It is practically impossible always to maintain under any **time** interval method a **space** interval between trains running at different speeds. For example, trains may be scheduled to move on ten minute intervals, but unless these trains are kept moving at the **same speed**, the ten minute margin may be reduced to zero. Should the margin be reduced by one of the trains stopping, entire dependence for protection against accident is placed upon the vigilance of the enginemen of an approaching train and upon the alertness of the flagman of the stopping train.

From this it will be seen that the time interval method affords no protection to a train that has stopped at other than a designated stopping point. The stopping train must at once provide its own protection by sending out a flag to stop a following train, and on single track a flag to stop a train approaching from the opposite direction. In other words, the stopping train must, for its protection, set up temporary signals for the purpose of providing space in which approaching trains can be stopped.

In the space interval, or block signal system, space is maintained between trains by dividing the road into sections with fixed signals to govern the movement from section to section.

The following story of the first use of block signals will show that the value of maintaining the space interval between trains was recognized over ninety years ago.*

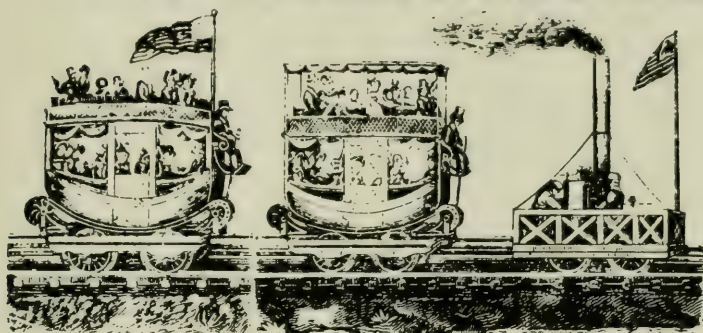
"Although the block system of signals is generally believed to be of English origin, it is a matter of record that it was in use on an American railroad, now forming a part of the Pennsylvania Railroad System in 1832.

"Soon after the New Castle and Frenchtown Railroad was opened for steam traffic (it having been operated for two or three years by horse power) the necessity for establishing a system of signals became apparent. This pioneer road was located across the peninsula composed of the southern part of

*From a paper on "Signals," by J. Elfreth Watkins of the Pennsylvania Railroad, 1899.

Maryland and the State of Delaware and extended from New Castle, on the Delaware river, 17 miles, to Frenchtown, on the Elk river, a tributary of Chesapeake Bay. Poles, thirty or thirty-five feet high, were located about three miles apart, and when the train started from either end the flagman at the terminal station hoisted a white flag to the top of the pole. The

NEWCASTLE AND FRENCHTOWN



RAIL-ROAD.

PASSENGER CARS,

PROPELLED BY A LOCOMOTIVE ENGINE,

Leaves the Depot, at NEW CASTLE, for FRENCHTOWN,

EVERY MORNING,

Upon the arrival of the Steam-boat from Philadelphia, at about

Half Past Eight o'clock,

RETURNING

Leaves Frenchtown at about Half-Past Ten o'clock.

ANOTHER TRAIN OF

PASSENGER CARS

Departs from New Castle, for Frenchtown, every evening, (except Sunday,) upon the arrival of the AFTERNOON BOAT, from Philadelphia, at about Six o'clock and on return arrives about Nine o'clock

Fare over the Road 50 cents.
Do., for excursion over the road and back 50 cents.

R. H. BARR, AGT.

New Castle, June 1st, 1833.

Poster advertising New Castle and Frenchtown Railroad, issued
 June 1, 1833.

flagman at the second station, whose duty it was to look through a nautical telescope every few minutes during the day, hoisted his flag to a point a few feet from the top of the pole. The remaining flagmen followed his example so that at New Castle it was known that the train had started from Frenchtown within a few minutes after it had left that station and each flagman was able to note its passage through each 'block.' After a time it was customary to hoist the flag on the Court House steeple at New Castle when the train departed from that point, the intelligence being communicated from block to block as above described, until the flagman at Frenchtown was in receipt of the information. When for any reason the locomotive became disabled, or the train was delayed by other circumstances, a black flag instead of a white flag was hoisted. This method of block signaling proved so satisfactory that flags after a time were dispensed with, and bell-shaped signals, consisting of peach baskets covered with colored cloth were used."

This crude block system, put in use twelve years before the advent of the electric telegraph in America, had many of the features of present day block signaling. The division of the road into block sections with fixed signals governing the entrance to each section corresponds with present day practice.

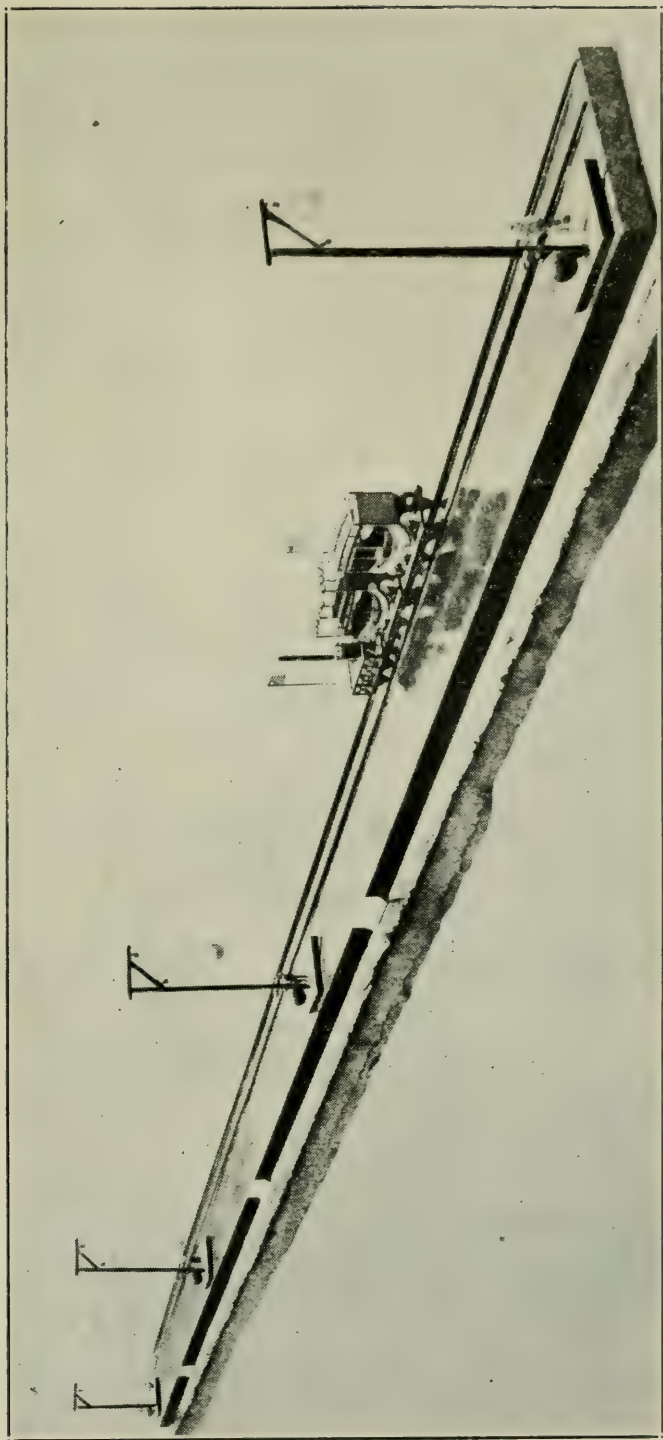
The fixed signals, as described, gave three indications, the ball at full mast, half mast, and the black ball. Today fixed signal indications are given by semaphores and by light signals. It seems significant that a black ball was used to indicate a disabled train. This indication has no counterpart in modern signaling.

The telescope of the man operating the signals has been replaced by the telegraph and the telephone for communicating from station to station. The control of the signals by the man has been replaced, in the automatic block system, by the track circuit by which the train itself automatically controls the signals that govern the section the train occupies.

The first complete block signal system in the United States was established in the year 1863 on the railway between Philadelphia and Trenton, now a part of the Pennsylvania Railroad. This signal system was put into use to provide for a heavy movement of trains carrying troops during the Civil War.

The principal advantages of the block signal system are:

A It provides a space interval between trains. It is self-evident that this is essential to safe operation.



Model of Block Signal System in use 1832 on the New Castle and Frenchtown Railroad. (The first Block System.)

B It provides an effective check against the many possibilities for error in directing train movement by written or printed instructions.

The following brief history of three collisions due to a misunderstanding of written instructions will serve to emphasize the importance of providing a check against the possibilities for error.

The first case illustrates the fact that the ever present danger of misunderstanding the meaning of the train order is an inherent defect in the method of directing train movements by written instructions. It is a startling example of a misunderstood order resulting in a collision between a northbound passenger and a southbound freight train on a single track road

Form O. D. 44.

19	TRAIN ORDER NO. <u>314</u>	19
	<u>3/11/4</u> <u>1920</u>	<u>3</u> <u>1920</u>
To <u>At E. C. 25th</u> At <u>Marion</u>		

X _____ Opr. _____ M.

*No crossing for 165
 wait at Bushnell
 until Jan 7th, 430
 PM for E. C. 25th*

STEK

(1)

Conduct and Engineer (and Pilot, if any) must each have a copy of this order, and must read the same to their Trainmen and Fireman respectively.

Made <u>Depler</u>	Time <u>4:15</u>	M. <u>Ex 100</u>	Opr. _____
--------------------	------------------	------------------	------------

Example of an illegible train order.

about six years ago. Ten persons were killed and thirty-two injured. The order was misunderstood because the name of the station where the trains were to meet was written so carelessly as to be misleading (the illustration was made from a photograph copy of the actual order.)

When the engineman of the freight received the order, he read it aloud to the fireman and to the head brakeman, as follows:

"No. 165 wait at Bellows Falls until 4:50 P. M.
for Extra 28 South."

The freight conductor also thought the order read Bellows Falls and the flagman agreed with him.

All five of these men misunderstood the order; in fact the name of the station where the freight was to meet the passenger train was Bartonville, and not Bellows Falls. The freight train passed Bartonville without stopping and about seven miles further on collided with the passenger train at high speed.

The engineer of the freight, killed in the collision, had been in the service 28 years, and the operator who wrote the order, 40 years.

The Interstate Commerce Commission held the freight train crew responsible for the collision through their misunderstanding of the order, and further made the recommendation that a block system be installed.

But no matter how plainly a train order may be written, the chance for misunderstanding may still exist. A serious head-end collision that occurred last year between two passenger trains is the second of the three illustrations.

The collision was on a single track line operated by time table and train orders, no block signal system being in use. The order that was misunderstood read as follows:

"Order No. 137.

First No. 82 meet No. 89 on double track at U——."

The engineman of train No. 89 stated that he read the orders to the conductor and also said that the wind was blowing considerably and in holding train order No. 137 his thumb covered the word "first" in the order and he read it as:

"No. 82 meet No. 89 on double track at U——."

Because of this misunderstanding, after first No. 82 passed, train No. 89 departed from S— and about three miles beyond collided with second No. 82. One person was killed and thirty-one were injured.

The engineman admitted that the train order No. 137 was

written plainly and that he misread it. He understood that his train was to meet all sections of No. 82 at U— and that a second order he received changed the meeting point for the first section to S— and that the second section was to be met at U—. The fireman stated that order was **not** shown to him. He knew of its contents only by what the engineman told him.

The Interstate Commerce Commission held both the conductor and engineman of train No. 89 responsible for their misunderstanding of the order.

These two collisions were both caused by misunderstood orders due to misreading. In the first case, because the order was badly written it was misread; in the second case, although the order was plainly written it was carelessly read.

These two cases illustrate but do not exhaust the possibilities for grave errors in the use of written instructions for directing train movements. The possibilities include not only the misunderstood order, but also the order that is forgotten and the order that is overlooked.

The forgotten order is too large a subject for discussion at this time. I will, however, as my third illustration describe how an overlooked order caused a head-end collision between two passenger trains. The collision occurred on a single track line operated by time tables and train orders. No block signal system was in use.

In this case three orders were issued, together with a clearance card stating that there were three, and were delivered in duplicate to the conductor of the south-bound passenger train, who in turn delivered one set to the engineman.

After the collision the engineman stated that it was his custom to oil the engine at C— and as his hands get dirty and greasy, he almost invariably asks the conductor when he comes to him with the orders to place them in a pocket of his overalls. He said this was the case in this instance, and that later he read the clearance card and **two** of the orders. About this time the engineman received a proceed signal, put the orders in his pocket and started. He further said that he might have had the **meet** order, but if he did have it he did not see it, and that he did not take the orders from his pocket after boarding the engine, and he was so engrossed in making hurried departure behind the first section of the train that he forgot to show the orders to the fireman. The engineman also stated that when he read the clearance card, he did not have on his glasses, and while the figure on the clearance card showing the number

of orders was a plain "3," he said he must have read it for a "2," and that he did not check the orders against the clearance card as the rules require.

The conductor tried to stop the train when he noticed it passing the meeting point. He acted too late. A north-bound passenger train collided with it at a speed of 35 miles an hour. One person was killed and fifty-six were injured.

The I. C. C. held the conductor and engineman responsible and called attention to the fact that an automatic block signal system was being installed but was not in service at the time of the accident.

These three collisions under the time interval method illustrate the danger in directing train movements by papers bearing written or printed instructions which may be forgotten or overlooked, and, in which a word misread may completely change the meaning.

The space interval method on the other hand, through the use of block signals, provides an effective check against this class of error. In the three cases cited the engineman would have had his error brought to his attention, not by a collision with an opposing train, but by the indication of a signal giving him ample warning of danger ahead.

In the time interval method, as previously stated, the movement of trains not provided for in the time table is directed by train orders. In the space interval method, although train orders are also extensively used, the standard code rules provide that block signals may be used in place of train orders.

The rules for this method of operation were first adopted by the American Railway Association in 1903 and 1904. These rules provide for the movement of trains with or against the current of traffic on two or more tracks by block signals whose indications supersede time table superiority and take the place of train orders. The rules adopted 1915 provide further for the movement of trains on single track by controlled manual block signals whose indications supersede time table superiority and take the place of train orders.

The movement of trains by block signals on two or more tracks **with** the current of traffic is in very general use. Train movement **against** the current of traffic, that is, in either direction on one or more tracks of a multiple track road, is in use on a number of heavy traffic roads. This method of directing the movement of trains by signal indication without train orders eliminates the unavoidable delays of the written train or-

ders, and makes possible the operation of trains at maximum track capacity.

The economic advantages of the space interval method, particularly for operation **with** the current of traffic, are fully appreciated, and increasing consideration is now being given to making a more intensive use of track facilities by train operation by signal indication in either direction on one or more tracks of multiple track roads.

Either direction operation first came into use as a means to increase the track capacity of double track roads, by adding a third track and operating the middle of the three in either direction.

The following is a brief summing up of what has been done:

The Chicago, Burlington & Quincy was one of the first railroads to operate three tracks in this way. A fourteen mile section of the main line near Chicago was put into use under this method in 1888.

At present the main line from Chicago west to Galesburg, Illinois, consists of 119 miles of double track and 44 miles of three tracks, or a total of 163 road miles. Both tracks of the double track and the middle track of the three tracks are signaled for operation in **either** direction. This intensive use of existing track facilities not only provides for the movement of a heavy traffic in and out of Chicago, but has also deferred the construction of additional main tracks.

The Baltimore & Ohio, in 1911, put in use on its Cumberland Division a 36 mile section of three tracks with the middle track operated in either direction by signal indication. The operation during the past 15 years has proven so satisfactory that the construction of a fourth track has not yet been found necessary.

The Pennsylvania Railroad had to meet a difficult situation on the section of the Middle division between Spruce Creek and Tyrone Forge, Pa., where the road follows the Juniata river and in a distance of seven miles crosses the river seventeen times. Due to the heavy cost of construction the four-track system of the division is limited to three tracks through this section. To provide for an increasing traffic the middle track, in 1913, was signaled for operation in either direction.

Through this method of increasing track capacity the construction of a fourth track has not yet been found necessary. The saving in interest charges alone on the cost of an additional

main track has been at the rate of \$15,000 a year, or for the 13 years, \$585,000. This amount is enough to pay for half the construction cost of a fourth track. These figures emphasize the value of an intensive use of track facilities through train operation by signal indication.

The Illinois Central, in 1925, put in use near Chicago a .25 mile section of three tracks with the middle track operated in either direction by signal indication. The operating results have been highly satisfactory.

The Delaware, Lackawanna & Western moves a heavy suburban traffic over its line between Hoboken and Millburn, N. J. Between West End Junction (two miles from Hoboken) and Millburn, there are three tracks for 15 miles. In 1922 either direction operation was put into use on the middle track for the 15 miles and on the north track for 4 miles. This arrangement provides a track capacity nearly equal to that of four tracks, as in the morning rush hours two tracks for 11 miles and three tracks for 4 miles are used for trains to New York. In the evening rush hours two tracks are used for the entire distance for trains from New York.

The traffic through the Hoboken Terminal is 70,000 passengers each week day, requiring the movement of 228 trains, or a train every 6 1-3 minutes throughout the entire 24 hours.

As the line passes through the city of Newark, the cost of constructing a fourth track is almost prohibitive.

The Chesapeake & Ohio at West Ashland, Ky., put into operation in 1925 a three-track section, 3.3 miles in length. This is the last word in three-track operation, as all three of the tracks are operated in either direction by signal indication.

Next in order is the operation in either direction of **both** tracks of double track roads by signal indication. The most notable example is the double track section of 119 miles on the Chicago, Burlington & Quincy, previously described. Both tracks are provided with automatic block signals for operation in either direction. Fast trains may easily run around slow moving trains.

Other notable installations are as follows:

Chesapeake & Ohio, six double track sections with a total length of 40 miles.

Illinois Central, 20 mile section adjacent to its three-track section.

Pennsylvania Railroad, on the line between New York City

and Manhattan Junction, eight miles, also a double track section on the Tyrone Division of five miles.

Either direction operation on double tracks by train orders is not included in this record.

In certain situations on four-track roads, traffic has taxed the capacity of the four tracks to a point where it has been necessary to operate one or all of the four tracks in either direction.

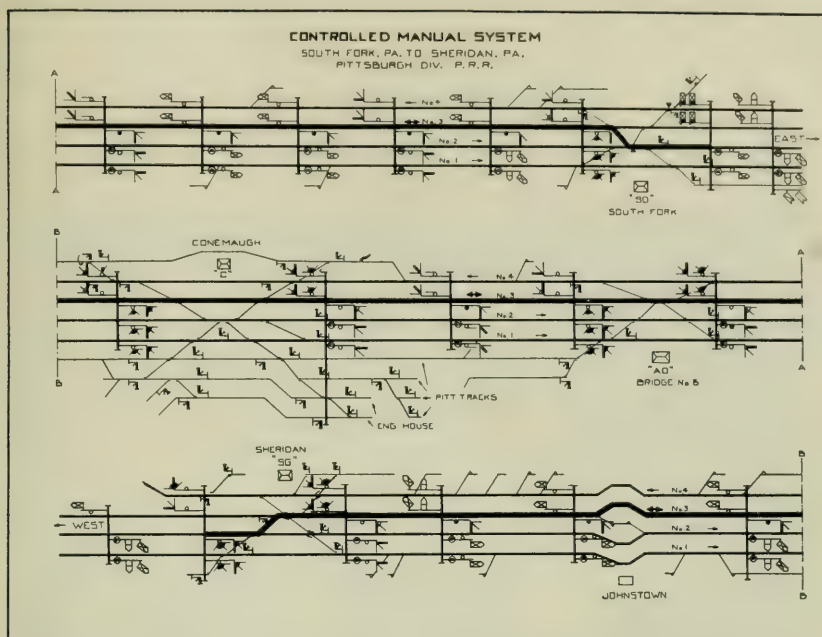
On the Pennsylvania Railroad, Pittsburgh Division, between South Fork and Sheridan, passing through Conemaugh and Johnstown, westward track No. 3 of the four tracks is operated for a distance of 11 miles in either direction by signal indication. This arrangement provides for the operation of three eastward and two westward main tracks. There is a normal daily movement through this section of 220 trains, 88 passenger and 132 freight.

The freight trains all stop at Conemaugh to take on helper engines and to clean fires before starting up the 24 mile grade over the Allegheny mountains. This, at times, congests both the eastward tracks. No. 3 track is then brought into use for eastward trains. There is a daily movement over this track of 11 eastward passenger trains.

These movements are made with little or no delay as they are governed entirely by signal indication without the use of train orders.

The illustration shows the four tracks, South Fork to Sheridan. The heavy line indicates the movement of an eastward train from track No. 2 at S. G. to No. 3 and from No. 3 back again to No. 2 at S. O.

The New York Central and New York, New Haven & Hartford enter New York over a four-track line extending from Mott Haven Junction to Grand Central Terminal, a distance of five miles. The Grand Central Terminal is a two level passenger station with 32 miles of track. The travel through this station requires the movement of 430 trains a day. During the rush hours the traffic reaches a total movement of 51 trains in one hour, or a train every 71 seconds. This heavy traffic made it necessary to increase the track capacity of the four-track approach. Additional main tracks would have required the enlargement of the tunnel, and the elevated structure through Park Avenue, and of the four-track draw-bridge over the Harlem river. The alternative of making a greater use of the ex-



Controlled Manual Block Signal System in use South Fork, Pa., to Sheridan, Pa., Pittsburgh Division, P. R. R., for either direction operation on track No. 3. (See heavy line.)

isting tracks was decided upon, and the westerly track of the four was put in use, in 1924, for either direction operation by signal indication. This provided an additional main track for outgoing movements, making three tracks available for this purpose in place of two.

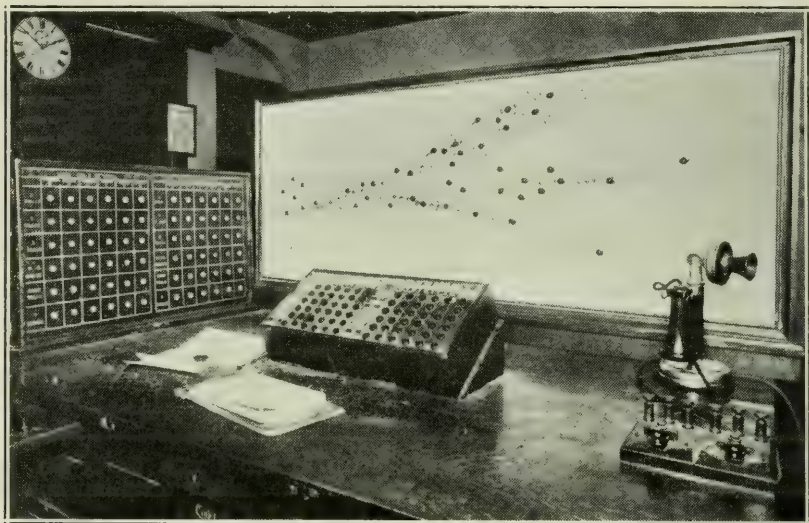
The cost of the signaling was \$90,000, a sum far less than the annual interest charges on the construction of an additional track.

The illustration shows the train dispatcher's desk in interlocking station A on the upper station level. In front of the desk is the illuminated track diagram, which indicates the movement of trains on the different tracks by small spot lights. In the center of the desk and on the left side are the push-buttons of the inter-communicating apparatus used by the director in sending and receiving information as to the movement of trains.

The New York, New Haven & Hartford at New Haven has a situation similar to that of the New York Central. The main lines from the north and north-east enter the station at New Haven through a "cut" only wide enough for four tracks, and, as the "cut" passes through the business section of the

city, heavy expenditures would be required to provide additional tracks. The traffic over the four tracks is 296 trains a day. The two center tracks are now operated in either direction for a distance of one mile by signal indication.

The Erie Railroad holds the record for either direction operation on four tracks. At Jersey City the four-track approach



Intercommunicating apparatus and illuminated diagram in train dispatcher's office, Grand Central Station, New York City.

to the station for a distance of two miles has all four tracks arranged for either direction operation by signal indication.

Train operation on single track by signal indication is not new as that method was put into successful use in 1882 on the Pennsylvania Railroad at Louisville, Ky. Proof of the value of that method of operation is found in the fact that the installation after 44 years of satisfactory service is still in use.

That installation was an early recognition of the many advantages of the space interval method (the block system) over the time interval method. In 1882 the line crossing the Louisville bridge over the Ohio River was single track, and on the Indiana side the line diverged east and west. The trains in and out of Louisville over the bridge totaled 150 a day. To direct their movements by time tables and train orders was difficult, if not impossible, because Standard Time had not come into use. Trains were scheduled on the local time of the four roads and each one had a different time standard. The time difference made it practically impossible to operate trains by time tables

and train orders. These, of course, require a single standard of time.

The difficulties in the situation brought the space interval method into use. Six manual block sections were established on the $5\frac{1}{2}$ miles of single track and $2\frac{1}{2}$ miles of double track covering the bridge and the tracks approaching it. A special dispatcher at the bridge station controlled the territory by directing the movement of trains through the operators at the other six block stations.

The dispatcher, in addition to making the usual train sheet record of the trains, uses a mnemonic board as an aid in visualizing their movements. This board is ruled off into vertical columns with a column assigned to each train. The columns sub-divided represent the different block sections. The trains are represented by small pegs which are moved from section to section by the dispatcher at the time he issues instructions to the block operators. This board is in effect a hand-operated train diagram.

At Louisville through the territory controlled by the signals there is, at present, a daily movement of 325 to 350 trains.

The successful operation of the system for nearly half a century has no doubt been due to the fact that trains are operated by block signals. Time tables and train orders were thrown into the discard as trains are operated entirely by signal indication.

Another early installation of train operation by signal indication was made in 1889 on the Nashville, Chattanooga & St. Louis Railway in the vicinity of Chattanooga, Tenn. The system covered 4.4 miles of single track and 1.6 miles of double track, divided into three manual block sections all under the control of the dispatcher at Chattanooga.

The system remained in use until 1912 when the line was double tracked. The total movement in the 24 years over the single track section was 518,000 trains. In addition to making a 100 per cent safety record, the system should have credit for having postponed the construction of a double track, thus saving the interest on the cost and the maintenance charges on the up-keep of a second track for 24 years.

The third installation was made in 1907 on the Pennsylvania Railroad in the vicinity of Huntley, Pa. This installation covered 8.6 miles of single track divided into two block sections. In this installation the controlled manual block system was

used, the signals being controlled by track circuits and by the operators.

This installation is still in use with an average daily traffic of 42 trains.

The fourth installation, made in 1909 on the Central New England Railway between Highland and Maybrook, N. Y., was notable as it relieved a traffic congestion which at times taxed the train dispatchers to the utmost. The installation covered 13.2 miles of single track and 7 miles of double track, divided into nine controlled manual block sections. Trains were moved by signal indication without train orders under a very simple rule:

"Electric signals will govern train movements on single track within these limits regardless of time table rights."

The daily traffic averaged 41 to 46 trains. Traffic capacity was increased 25 per cent and double tracking was postponed for five years. The original signals were used in the double track signaling.

The total net saving for the five year period in interest charges and maintenance, by deferring the double tracking, exclusive of any saving in operating expenses, amounted to \$315,000, equal to 44 per cent of the total cost of the double tracking. The signals not only paid their own way, but helped to pay for the double tracking.

The fifth installation, in 1911, and the second on the Nashville, Chattanooga and St. Louis Railway, was between Cowan and Sherwood, Tenn. The installation covered 11 miles of single track divided into four controlled manual block sections with an average daily movement of 34 trains. In 1911, the traffic having reached a daily average of 56 trains, 2½ miles of the line were double tracked.

That section is the limiting point of the division and is a difficult one to operate on account of the heavy curvature and the 2 per cent grade, requiring pusher service, over the Cumberland mountains. As no less than 50 train orders per day were eliminated by operation by signals, the delays incidental to operation by train orders were reduced.

The sixth installation, made in 1919 on the Chesapeake & Ohio Railway between Cotton Hill and Gauley, West Virginia, covers four miles of single track divided into three controlled manual block sections. A distinctive feature of the installation is the use of a hand-driven A. C. generator of 125 cycles for

operating the traffic locks controlling the signals. The daily traffic averages 38 trains.

In this case, as well as in those previously described, the installation increased safety, reduced train delays, increased track capacity, and postponed the date of double tracking. If the construction of the double track can be postponed five years longer, the savings in interest charges will equal half the cost of providing the additional track.

The seventh installation was made in 1925 on the Missouri Pacific Railroad in the vicinity of Kansas City, Mo., and covered 56 miles of single track with 14 passing sidings. Twelve of the siding switches are operated from the nearest stations, thus permitting trains to enter and leave sidings without stopping to throw the switches. Train movements are directed entirely by signal indication under a controlled manual block system with automatic train control. The daily traffic is 32 to 40 trains. Double tracking estimated to cost at least \$2,000,000 has been postponed.

The results, as stated by the railroad, based on comparison of the months of October, November and December, 1924, and January, 1925, with the same months of 1925 and 1926, are as follows:

Average speed of freight trains increased from 10.45 miles per hour to 12.14 miles per hour, or an increase of 16 per cent.

The gross ton miles per train hour increased from 20,152 to 23,513, or an increase of 17 per cent.

Coal consumption per month decreased from 209 lbs. to 192 lbs., per thousand gross ton miles, or a decrease of 8 per cent.

In addition to these improvements in operation, the saving in interest charges on the cost of the construction of the second main track will amount to no less than \$100,000 per annum.

This last installation completes my record, which includes not only the installations of train operation by signal indication for "either direction" movements on one or more tracks of multiple track roads, but also includes the installations on single track roads. Even if the record should not include all of the installations that have been made, it is believed to be sufficient to prove the value of operating trains by signal indication.

No claim is made that the results accomplished were entirely due to the signaling, as many factors usually enter into any improvement in train operation. This is particularly so on

single track where coincident with signaling provision is made for better siding facilities and the operation of siding switches.

The purpose of this paper has been to point out the inherent defects in any time interval method and to emphasize the value of the space interval method, and also to direct attention to the marked advantages of substituting signal indication for the train order in directing the movement of trains.

Efficient transportation is largely dependent upon an efficient direction of train movements and much depends upon the kind of instructions used in directing train movements.

Train orders are written instructions and must be delivered to the conductor and engineman of the train. They must be correctly prepared, carefully transmitted, and faithfully delivered. Above all, they must be uniformly understood by all concerned, and must not be forgotten. On railroads **not** equipped with block signals, safety of operation depends entirely upon the human element. There is no check by a block signal against an improper train movement should an error or failure occur in the preparation or delivery of the order, or should the order be misunderstood or forgotten.

Signal indications are instructions given by the aspects of fixed wayside signals. Instructions given by signal indications require less effort in preparation and transmittal than do written instructions. They are delivered to the engineman from block to block through the medium of the signal. The language of the signal is easy to understand and difficult to forget. The signal aspects are few in number and may be regarded as instructions reduced to the minimum in standard form, and hence, there is little opportunity for misunderstanding. The instructions conveyed by the signals are given at the point where they are to be executed and there is no lapse of time in which to forget them.

In conclusion, the case of signal indication versus the train order as the method for directing train movements may be briefly summarized in three points:

- 1 The science of signaling has now developed far beyond the stage of experiment. Abundant experience has proved that directing train movements by fixed wayside signals is both practical and efficient.

- 2 The construction, maintenance and operation of a signal system for directing train movements by signal indication can all be carried out by methods that have stood the test of time.

- 3 Experience in every case has shown substantial economic

advantages, an increase in safety, a reduction in train delays, an increase in ton miles per train hour, and a decrease in total ton mile cost.

PRESIDENT: I think Mr. Sperry has pointed out very clearly, all the advantages of signal indication. I would like to have you now start what I hope will be a very lively discussion of this most interesting subject, and I know that Mr. Sperry will be very glad to answer any questions that you may care to put to him.

MR. W. M. POST: (Of Signal Committee:) The opening remarks of the Chairman tonight might lead you to think the entire membership of the Signal Section is here. The Signal Section is a Section of the American Railway Association which has over two thousand members from all of the railroads of the country. The Signal Section is composed of twelve standing Committees and one Special Committee. Committee No. 1, to which has been assigned the study of the economics of Railway Signaling is here, and that Committee is composed of Railroad officials, and they call in to consult with them Signal Company representatives, and Mr. Sperry works with them as Consulting Engineer. Mr. Sperry does a very large part of the work for Committee No. 1, and Committee No. 1 gets all the credit, so I think it is particularly gratifying to the members of Committee No. 1 that Mr. Sperry will receive all the credit for this very valuable paper. Committee No. 1 has been studying the question of moving trains by signal indication in order to show that there is something more to signals and interlockings than merely safeguarding trains.

There has been a growing belief among railroad officers that signals properly installed and properly operated can be justified from an economic standpoint and we believe that the growing acceptance of that belief has been due in some measure to the work of Committee No. 1. They have been gathering data to show that signals will pay for themselves by facilitating traffic, and we believe that this paper has been one more contribution to bring to the attention of the railroad officers this very important fact.

PRESIDENT: Thank you very much, Mr. Post. It is my understanding that Mr. Saunders, a member of the Signal Committee, and of the D., L. & W. Railroad, is in the room; I am sure we would like to hear from him.

MR. J. E. SAUNDERS: Mr. Sperry has outlined one of the means by which we have made signals more than pay for themselves on the Lackawanna, when he spoke of reverse traffic operation. Where we have a train every minute and a half at certain periods of the day, we must run trains on all three tracks in the same direction. Where double track is in operation, we have practically eliminated 31 train orders. In fact, most of the orders are merely transmitted as information in the form of messages.

Traffic on the Lackawanna is now protected by automatic signals on 97% of its passenger track mileage. For railroads that are not so fortunately placed with respect to signals, I think they offer safeguards greater than ever before, and the Signal Engineers are encountering much less opposition in presenting the subject to the management than they did before the time that the economics of signaling was appreciated, and now that it can be demonstrated, as Mr. Sperry has shown here tonight, the installation of signals will be probably greater than ever before.

Mr. Sperry's untiring effort to put the economics of signaling before railway executives is beginning to bear fruit. Mr. Anderson, Superintendent of Signals, Chesapeake & Ohio Railway, who is chairman of the Signal Section Committee of Economics, is here, and I know has something to say on this subject.

PRESIDENT: Thank you; we would be very glad, indeed, to hear from Mr. Anderson, Chairman of Committee No. 1, of the A. R. A., connected with the Chesapeake & Ohio Railroad, of Richmond, Virginia.

MR. BURT T. ANDERSON: Mr. Chairman and members of the Railway Club of Pittsburgh, I could add very little to what Mr. Sperry has stated on the question of moving trains by signal indication. It has certainly been a treat to me and to the members of the Committee on Economics of the Signal Section of the American Railway Association to be present and hear this paper. Although we have been familiar with the details of this practice on some railroads, I do not believe we have realized that so much has been done towards moving trains by signals, without the use of train orders. I do not see how some of these railroads could have handled the present traffic safely without signal indications.

On the Lackawanna, the New York Central, Pennsylvania,

Burlington, and Chesapeake and Ohio the traffic had reached a point where it was necessary to build additional tracks or to utilize their present tracks to greater extent. This problem was put up to the Signal Departments to handle and it has been a great credit to them that they have been able to solve this problem at a very small cost of additional expense compared with the cost of additional tracks.

The advantage of having a system of this kind has been to provide additional safety, a reduction in number of train delays, train movements have been facilitated, signals have proven of economical benefit and labor of handling train orders has been greatly reduced.

It is interesting to know that railroads adopting this type of signaling are gradually extending the practice.

It has been a great pleasure to be with you tonight and hear the talk by Mr. Sperry.

PRESIDENT: Nearly every meeting we get some very enlivening comment from Professor Endsley. I would like very much to hear from him tonight on this subject.

PROFESSOR LOUIS E. ENDSLEY: I might say that two weeks ago, day before yesterday, I rode on a railroad without any air on the train, without anything but a steam jammer on the engine and without signals. That was at Baranquilla, South America, and going down the hills, which are very bad in some places, heard the whistle for the brakes. We happened to make a very good stop. This paper tonight shows what we have done in America over what some of our neighbors have done, and I tell you, after having been down there for a while and getting back to where I can see the Statue of Liberty and home on the Pennsylvania, I felt like saying: "Thank God for America."

PRESIDENT: I am informed, I thought after the dig that he gave me a little while ago, that he would have gone out, I understand Mr. George W. Wildin is in the room; we would like to hear from him.

MR. WILDIN: Mr. President, I know you don't expect me to talk intelligently about signals, because I know that all of you know that I don't know anything about them, and I am not going to expose my ignorance by asking questions. There is just one signal that I understand and never misinterpret,

that is the one calling us to the table at the other end of the room. If you will hoist that signal, I will be satisfied.

MR. H. C. GIVLER: Mr. Sperry's paper, as just read, takes me back about twenty-six years, when the New York Central took over the Beech Creek, Fall Brook and R., W. & O. Railroads. We had no block signals at that time. We had a run from Williamsport to Mahaffey, a distance of 121 miles. We would leave Williamsport or Jersey Shore on Monday and get back again on Saturday. That was with the No. 31 and No. 19 orders. We would get as far west as the Viaduct and probably lay there 16 or 20 hours and come out of the office there with one handful of No. 31 orders and No. 19 orders in the other. We had some time trying to find out which was our running order.

Superintendent J. B. Stewart came up to the Viaduct at one time and when the crew started to leave, after about 8 or 10 hours' delay, they would wonder what was the running orders, also.

President P. E. Crowley, of the New York Central, had just come down off of the R. W. O. Railroad, and after about one year, they installed the block system and the railroad improved 100 per cent. Before this happened, single line railroading was some job. Just ask P. E. Crowley; he can tell you a lot about it at that time. The block system and the good work of Mr. Crowley was the reformation of the single line railroad to what it is today on the Old Beech Creek.

MR. HENRY F. GILG: Mr. President, I don't think that Mr. Wildin will obey the signal over on this side of the room. He won't eat anything and he won't drink anything that you will find at the table. I think that was just simply camouflage when he said that. The Subject Committee is to be congratulated and commended for bringing Mr. Sperry here, and Mr. Sperry's paper has been so interesting that I believe he deserves a rising vote of thanks, therefore, I make a motion that we thank him in that way.

PRESIDENT: Gentlemen, it has been moved and seconded that, as an expression of appreciation of Mr. Sperry's paper, we extend a rising vote of thanks. All in favor indicate by rising.

The motion prevailed by unanimous rising vote.

There being no further business, upon motion, adjourned.

J. D. CONWAY, Secretary.

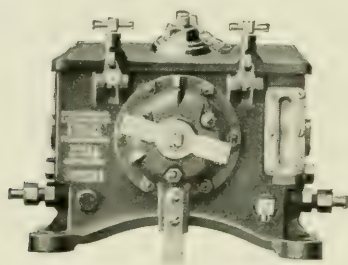
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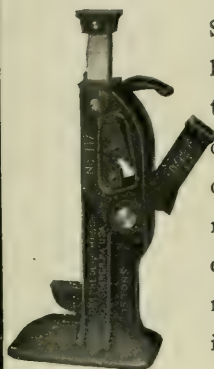
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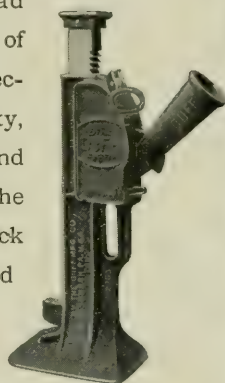
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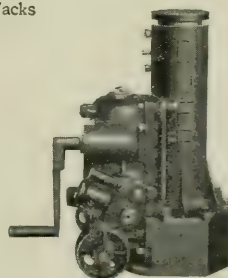
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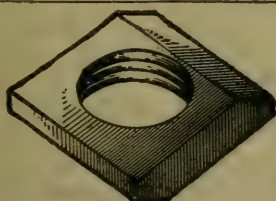
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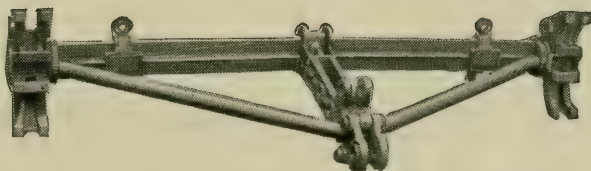
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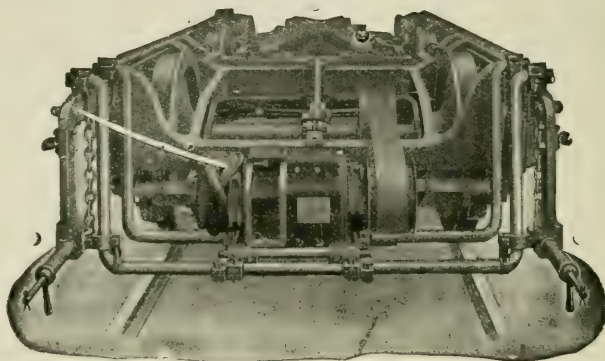
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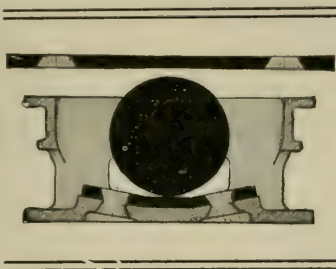
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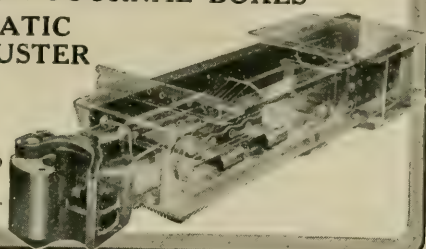
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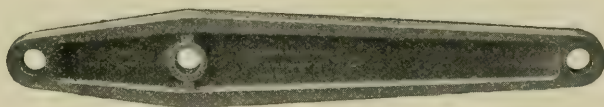
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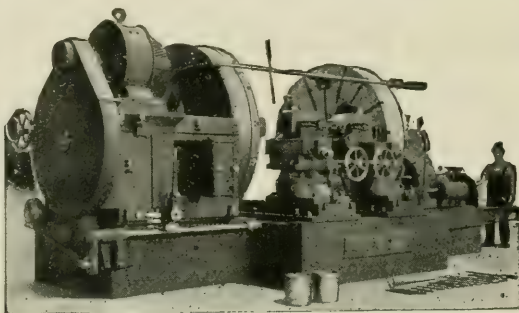
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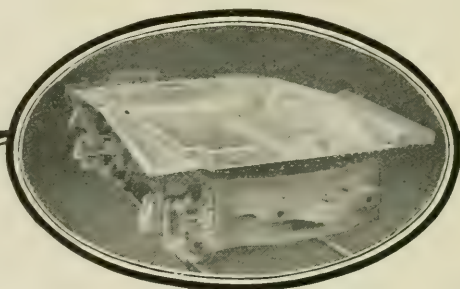
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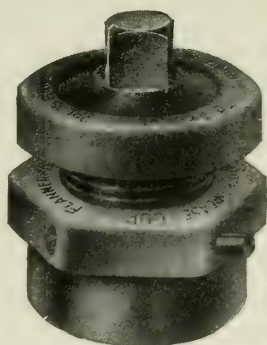
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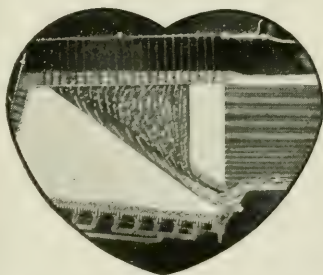
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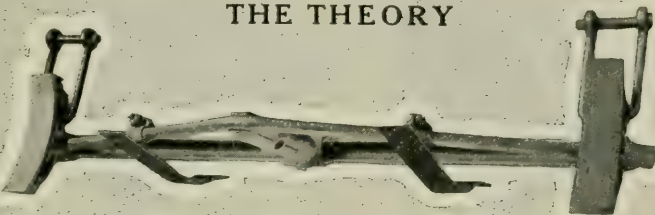
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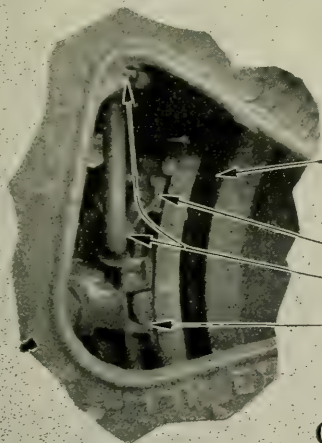




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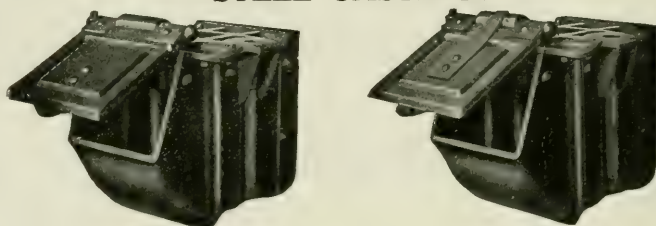


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OF

The Railway Club of Pittsburgh

Organized October 18, 1901

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Pittsburgh, Pa., April 25, 1926.

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D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATHERS	November, 1910, to October, 1912
A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
J. G. CODE	November, 1916, to October, 1917
D. M. HOWE	November, 1917, to October, 1918
J. A. SPIELMANN	November, 1918, to October, 1919
H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAH	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
D. F. CRAWFORD	November, 1922, to October, 1923
GEORGE D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

April 25, 1926

The meeting was called to order at the Fort Pitt Hotel, Pittsburgh, Pa., at 8:00 o'clock p. m., President Frank G. Minnick in the chair.

The following gentlemen registered:

MEMBERS:

Adams, Lewis	Hughes, J. E.
Allen, E. J.	Hyde, W. B.
Allen, Harvey	Hykes, W. H.
Altsman, W. H.	Irwin, G. H.
Anderson, A. E.	Johnson, Bradley S.
Anderson, F. W.	Jones, Richard T.
Arnold, J. J.	Jungbluth, Adolph
Bain, George F.	Kelly, H. B.
Beam, E. J.	Kelly, J. P.
Berg, K.	Kempton, J. W.
Bernoulli, W. H.	Ketterer, Frederick P.
Bevan, P. A.	Kimling, Carl
Berg, J. E.	King, O. B.
Brueckner, A. J.	Knox, William J.
Campbell, J. E.	Kroske, J. F.
Campbell, J. T.	Kummer, Jos. H.
Champion, James H.	Leck, G. F.
Chase, C. N.	Lee, L. A.
Christy, F. X.	Leet, C. S.
Conway, J. D.	Lehr, H. W.
Courtney, H.	Lewis, Walter M.
Cunningham, W. P.	Miller, John
Dambach, C. O.	Mills, C. C.
Davis, Charles S.	Minnick, F. G.
Dierker, R. H.	Mitchell, F. K.
Doran, F. E.	Mitchell, W. J.
Eagan, D. F.	Mitchell, W. S.
Emery, E.	Moses, Graham Lee
Endsley, Louis E.	Moyer, Oscar G. A.
Fenton, H. H.	Muir, R. Y.
Freshwater, F. H.	McAbec, W. S.
Frey, W. H.	McLaughlin, H. B.
Fritzky, Vincent	McManus, C. J.
Furch, George J.	McNelly, A. P.
Gilg, Henry F.	McVay, W. H.
Goff, J. P.	Orndorff, J. R.
Harris, J. L.	O'Toole, J. L.
Headington, R. V.	Painter, Joseph
Heston, E. L.	Passmore, H. E.
Holmes, E. H.	Perkins, H. E.

Purnell, C. S.
 Rauschart, E. A.
 Read, Harry J.
 Reardon, M. J.
 Reckley, A. P.
 Richardson, H. R.
 Robbins, John A.
 Robinson, R. L.
 Rodgers, D. J.
 Rogers, Robert
 Ryan, William F.
 Sattley, E. C.
 Seiss, W. C.
 Sheridan, T. F.
 Simons, Philip
 Smith, Frederic M.
 Smith, J. L.
 Smith, M. A.
 Smith, R. W.
 Smith, Robert M.

Stebler, W. J.
 Stenson, Geo. A.
 Stevens, L. V.
 Stewart, L. S.
 Strohmer, J. L.
 Stucki, A.
 Sylvester, H. G.
 Thomas, C.
 Van Vrankin, S. E.
 Wildin, Geo. W.
 Wilson, D. L.
 Wood, E. H.
 Wood, John H.
 Wright, O. L.
 Wynn, C. A.
 Wynn, E. M.
 Wynn, M. E.
 Zeher, W. G.
 Zimmerlink, M.
 Zollinger, S. W.

VISITORS:

Baker, H. M.
 Binkerd, Robert S.
 Carey, J. L.
 Collins, G. C.
 Lewis, S. B.
 Painter, C. L.
 Paret, H. W., Jr.

Porter, L. K.
 Raskind, Dr. D. M.
 Schloss, Herbert A.
 Schuyler, A. J.
 Sunderbrink, C. W.
 Wagner, J. M., Jr.
 Woodward, Robert

Wyckoff, Roy L.

PRESIDENT: The Roll Call will be dispensed with, the record of attendance being had from the registration cards.

If there is no objection, the reading of the minutes of the previous meeting will be dispensed with, as they are to appear in printed form.

The Secretary read the following list of applications for membership:

Aulbach, A. J., Yardmaster, P. & L. E. R. R., 318 Quincy Avenue, Mt. Oliver Station, Pittsburgh, Pa. Recommended by C. Thomas.

Brady, T. Joseph, Vice President, Vanderbilt Coal & Coke Company, 918 House Building, Pittsburgh, Pa. Recommended by J. A. Beattie.

- Briscoe, James, Manager Steam Specialty Department, Manning, Maxwell & Moore, Inc., 1005 Park Building, Pittsburgh, Pa. Recommended by Norman Allderdice.
- Burkley, H. S., Master Mechanic, B. & O. R. R., 230 Winston Street, Pittsburgh, Pa. Recommended by J. R. Orndorff.
- Cross, Harry W., Sales Representative, Mach. Dept., Manning, Maxwell & Moore, Inc., 1005 Park Building, Pittsburgh, Pa. Recommended by Norman Allderdice.
- Davis, R. M., Transportation Division, Westinghouse Electric & Manufacturing Company, Chamber of Commerce Building, Pittsburgh, Pa. Recommended by A. P. Schrader.
- Derr, A. I., Asst. to Vice President & General Manager, P. & W. Va. Ry., Wabash Building, Pittsburgh, Pa. Recommended by C. O. Dambach.
- Frauenheim, H. T., President, Standard Auto-Tite Joint Company, 915 House Building, Pittsburgh, Pa. Recommended by J. A. Beattie.
- Goodman, John C., Office Manager, Manning, Maxwell & Moore, Inc., 1005 Park Building, Pittsburgh, Pa. Recommended by Norman Allderdice.
- Hallman, L. C., Locomotive Engineer, P. R. R. System, R. D. No. 2, Box 233, Altoona, Pa. Recommended by Eugene Prouty.
- Hatcher, J. J., Power Plant Foreman, P. R. R. System, 313 Murdock Avenue, Mingo Junction, Ohio. Recommended by A. P. Schrader.
- Johnson, Robert S., Engineer, P. & W. Va. Ry., 7617 Race Street, Homewood, Pittsburgh, Pa. Recommended by Herbert Lewis.
- Kane, J. P., Blacksmith Foreman, B. & O. R. R., 21 Mansion Street, Pittsburgh, Pa. Recommended by J. R. Orndorff.
- Laughlin, John, Engineer, Mon. Con. R. R. Co., 4103 Winterburn Street, Pittsburgh, Pa. Recommended by H. R. Wynn.
- Lunn, Frank F., Ticket Agent, P. & L. E. R. R., 1113 Hiland Avenue, Coraopolis, Pa. Recommended by F. C. Smith.
- Mertz, G. H., Freight Agent, Mon. Con. R. R. Co., 4035 Murray Avenue, Pittsburgh, Pa. Recommended by James R. Geddes.

- Mundy, F. I., General Foreman of Carpenters, P. & L. E. R. R., 268 East Second Street, Beaver, Pa. Recommended by J. A. Noble.
- Miller, E. B., District M. C. B., B. & O. R. R., 224 Shiloh Street, Pittsburgh, Pa. Recommended by J. R. Orndorff.
- Murphy, Daniel, Yardmaster, P. & L. E. R. R., 124 Stewart Street, Mt. Oliver Station, Pittsburgh, Pa. Recommended by John A. Robbins.
- Myers, Thomas P., General Foreman of Carpenters, P. & L. E. R. R., 826 Seventh Avenue, Coraopolis, Pa. Recommended by J. A. Noble.
- McNellie, W. P., Secretary and Treasurer, Imperial Oil & Gas Company, 118 Ulysses Street, Pittsburgh, Pa. Recommended by C. Thomas.
- Nessle, J. B., Traffic Manager, P. & L. E. R. R., P&LE Annex Building, Pittsburgh, Pa. Recommended by L. C. Bihler-Charles Orchard.
- Peterson, Edward J., Foreman of Carpenters, P. & L. E. R. R., 1112½ Chartiers Avenue, McKees Rocks, Pa. Recommended by J. A. Noble.
- Rossell, R. T., Vice President, B. & L. E. R. R., 747 Union Trust Building, Pittsburgh, Pa. Recommended by Henry F. Gilg.
- Savage, J. K., Salesman, Westinghouse Electric & Manufacturing Company, Chamber of Commerce Building, Pittsburgh, Pa. Recommended by A. P. Schrader.
- Stevenson, Richard, Storekeeper, P. & L. E. R. R., Newell, Pa. Recommended by J. W. Kempton.
- Vates, C. A., Foreman of W. S., P. & L. E. R. R., 808 Lillian Street, Pittsburgh, Pa. Recommended by H. C. Osborne.
- Wholey, V. A., General Traffic Manager, P. & W. Va. Ry., Wabash Building, Pittsburgh, Pa. Recommended by C. O. Dambach.
- Woodward, Robert, Machinist, P. R. R. System, 903 Oak Avenue, Turtle Creek, Pa. Recommended by W. J. Mitchell.
- Yohe, C. M., Purchasing Agent, P. & L. E. R. R., Pittsburgh, Pa. Recommended by F. G. Minnick.

PRESIDENT: These applications will be referred to the Executive Committee in due course, and upon approval by them the gentlemen will become members without further action than the payment of the current year's dues.

PRESIDENT: Is there any further business to be considered at this time? If not, we will proceed to the paper of the evening. I do not know how well the speaker of the evening is known to the members of the Club. He is, however, well known to many Pittsburghers. Further, he is well known throughout what is known as the Eastern Territory of the United States, east of the Mississippi River and north of Mason and Dixon's Line. He has a subject that will prove of great interest to all of us, I am sure, and because of his experience in railroad problems generally he is peculiarly well fitted to deal with the subject listed for discussion tonight. It gives me a great deal of pleasure to introduce to you Mr. Robert S. Binkerd, Vice-chairman of the Committee on Public Relations of Eastern Railroads, New York City, who will address you on the subject of "A Square Deal on Valuation and Earnings."

A SQUARE DEAL ON VALUATION AND EARNINGS

By MR. ROBERT S. BINKERD, Vice Chairman,
Committee on Public Relations of the Eastern Railroads.

Mr. President and Friends of the Railway Club of Pittsburgh: On a sleeper on the X. Y. X. Railroad a rather large gentleman was getting into an upper berth. He already had one knee on it when he turned to the darkey porter and informed him that he had had several very bad nights and if the porter allowed anything or anybody to disturb him he would wring his d——d neck for him. You can imagine the porter paid particular attention to that upper berth. In due time there was more than one form of evidence that the gentleman was getting the desired sleep. One of those forms of evidence merely assaulted the ear. Unfortunately he had gotten shaken up enough that he had turned facing the wall of the car, and being a robust gentleman the curtains had rather fallen away from a complete closing, and his pajamas were far drawn from the customary. The darkey decided that a situation was presented that required his judicial notice. Just at that moment the brakeman came in the car, and the darkey turned to him and pointed out the sight and asked what he should do. The

brakeman said "I don't know, I have just been on this run the last week, but there must be something in the rules to cover it. I will go back and look." In about five minutes he returned bearing in his hand the familiar Book of Rules and in his other hand a familiar red lantern. He told the darkey to get out his ladder, and he got up and hung the lantern from the middle of the curtain rail. He was surveying his handiwork with a good deal of satisfaction when in came the conductor. He took one look and said, "What is going on here?" The brakeman said, "That is orders." "Orders," said the conductor, "what orders?" The brakeman dug down in his pocket and pulled out his rule book and started to thumb it over until he came to Rule 47. Rear end exposed, if not in ———, display red light prominently after sun down.

That is a good railroad story in more ways than one, principally because it illustrates what has been for many years the chronic position of the railroad industry in modern society absolutely dependent on it. Every rear end has always been exposed somewhat and there have not been enough red lanterns to go around to hang in all the necessary places. Since the war, as we all know, things have been greatly improved. Business in this country is conducted in a much more intelligent and orderly fashion. Shippers and producers and even consumers are willing to do some part of their own business and not blame everything on the railroads, and in general there has been a revolution, a beneficial revolution, in the relations between the railroads and the public. But we must not hide from ourselves the fact that we are passing out of the period when our unquestioned poverty and the fine period of friendly co-operation were among our assets. We are getting to a period when we will make not anything like an adequate income, but so much more than it was as to attract attention. And further, we are approaching the time when we are going to come to a real test as to how far a sincere people, absolutely dependent on these railroads of ours have come to understand some of the basic fundamental principles on which our efficiency and solvency and their service and safety depend.

Now you men all know that in 1913 a law was passed purporting to require a physical valuation of the railroads as a basis of measuring earnings. That led to the statement and allegation, which filled this country, to the effect that if the physical properties of these railroads could only be calculated and reasonably appraised at their fair value on pre-war costs,

it would be found that the railroads were tremendously over-capitalized and when the resulting water was squeezed out of the capitalization the people of the United States would have a new basis for making low rates. All the physical property belonging to the railroads has been inventoried and calculated and practically every road has been covered by at least tentative engineering and land surveys and it is no secret when I say to you that the pre-war reproduction cost of the property they found in those railroads would exceed by three or four billion dollars the property investment account of the railroads. So that those who started out to value the railroads were faced with a dilemma. Instead of being able to show this miserable water, they found themselves put to it to adopt dodges and stratagems by which they could reduce even the pre-war values of these properties to anything like our property investment account.

Now among the means they have used to this end is to deny to the railroads recognition of all expenditures outside of the right of way to keep water off it, water being, as we all know, the great enemy of our road beds. They have denied all expenditures made off the right of way in connection with the separation of grades, even though those expenditures were a part of the contracts entered into with public authorities. They have reduced the material and supply and working capital allowances to about half what practical experience has shown to be necessary. They have refused to value seasoned tract. All they attempt to do is to value the material that goes into the tract, without any allowance for the cost of getting that material to the right of way. But on cross-examination the witnesses of the Board of Valuation will admit that this is only raw or green track and it would be utterly incapable of carrying the traffic of today at the rates of speed we normally employ. But to a non-legal and utterly untechnical mind on this subject nothing can be more illuminating than their method of arriving at the value of the material put on the right of way and the track on the original construction. It is a value given after the railroads are already there and in existence, and no allowance is made for the actual cost of putting it there under conditions of primitive transportation. At the hearing on the Great Northern valuation last October this point was brought out from the Commission, apparently to the surprise of some of its members. One of the Commissioners leaned forward and asked the solicitor of the Bureau of Valuation whether he did not believe it

would be fair to give credit for the actual cost of getting these materials to the right of way where it was to be used. What do you think, he replied?

* * * * *

Of course the expense to which he referred was an element of value and an element of value that was not contained in practically any valuation yet entered into by the Commission.

Then there is this question of accrued depreciation. So far as I know no railroad could contend that when it replaces an old piece of property with a new one the addition to gross investment should not be the price of the new piece of property, less the depreciation on the old piece of property. But they do contend that the subtraction from their valuation of their accrued depreciation is nothing but an actual confiscation of value.

You may know, we can look around this eastern territory, three or four railroads brand new in the last twenty years, built according to the best methods of construction available at the time, every dollar in those roads invested under the strict accounting rules of the Commission established in 1907, every dollar invested then representing today even more than one dollar's worth of property, yet by accrued depreciation and deduction they credit only 88 to 90 cents out of every dollar they invested less than twenty years ago.

The sum total of all these things runs into three or four or five billions of dollars. I do not need to say to you gentlemen that property value of the railroads is essential to their credit.

These railroads of ours can't perform their service of tomorrow "sitting on what they ain't got almost." They have got to be sitting on a basis of recognized value and earning power, which is big enough and obvious enough for you and me to hazard paying out our savings on, in the purchase of new railroad securities to furnish new facilities for the commerce of the people of this country.

In the next few years we are, of course, going to see every one of those questions contested in the courts, because it appears to be the determination of the Commission to carry through the application of every one of those limitations to actual valuation, and they will be revised, so far as the courts mark them up. That the courts will mark them up, every decision the Supreme Court has rendered in the last 25 years would indicate, because if there is anything settled in the law,

it is, that we are entitled to a safe return on a fair value of our property at the time of rendering service.

But those are some of the reasons why in showing our monthly earnings of the railroads, we no longer give the rate of return on the property investment account of the railroads, not because that is adequate, but because it is less inadequate than the I. C. C. tentative valuation of 1919.

For many years our people suffered under most curious and grotesque obsessions about the high cost of transportation. There are certainly two or three ideas which every railroad man in this country, and ultimately every sensible citizen, has got to come to realize. It seems to me one of those, is the fact that the interest of the individual citizen, whether as a producer, as a worker or as a consumer, is in the adequacy and the character of the service we render, and not in the level of freight rates. I am not going to discuss freight rates except to say that as a general matter on things of common consumption they are so small a part of the cost of production and distribution that you can raise or lower freight rates 10% or 20% and in most cases the consumer will not know the difference. There is hardly a pound of food that passes over your dinner table on which the freight rate is as much as a cent, and I defy anybody to reduce the cost of living by reducing freight rates on food. It is difficult to see how the cost of living will be reduced by reducing the 5 cents they get for hauling a pair of shoes or 6 cents for hauling a suit of clothes. But since the war the railroads, by improvement of service, have been able to demonstrate such economy of adequate transportation that it ought to be impossible in the future for any citizen to go around our streets laboring under the delusion that there is any other kind of transportation that is cheap except adequate and efficient transportation. In the effort to intensify the production of transportation out of our tools, what have we done? In the last three years we have cut the average time of transit in half. We have moved production and consumption twice as close together as they were before. We have put it within the power of every producer to carry a given volume of product with a smaller accumulation of power and material in advance of manufacture; we have put it within the power of every producer to carry a smaller amount of manufactured goods in advance of consumption; we have put it within the power of every consumer or retailer to conduct a given volume of business with a very much smaller stock. We have not only abolished car

shortage, which Secretary Hoover said cost \$1,000,000 every time it happened, but we have kept in a liquid condition not only millions but billions of mercantile and industrial capital in this country.

The Annual Report of the Federal Reserve Bank for the year 1925 says this:

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So here we have the explanation of the great tide of business and volume of production and consumption being managed without rising prices, but on the contrary acutely sensitive to almost the slightest pressure from the consumer. We have this great volume of business kept in circulation, not with high money, but with cheap money so there is enough free capital to carry on not only all our business and meet every demand for enlargement of capital, but to help our friends in Europe, all a part of the by product of the best transportation service the railroads of this country have ever given to the people of the United States.

In the next place we must make every effort we can to get our leading fellow citizens to understand the highly dynamic character of the industry for which we work. We all know there is no such thing as a perfect railroad except insofar as it is in the best possible balance to meet the demands that are to be made on it right now. But in the early days when traffic was light and lumber and steel and labor were cheap, the efficient and economical thing was to go around obstacles rather than through or over them. To build a modern trunk line railroad in the development days of this country would have been just as much an economic crime as it would be today to try to carry the traffic of today over a jerk line railroad of those days. The increase in the volume of traffic to be handled created a new situation, incurred a new balance of financial investment and operation, and to achieve that new balance requires, as we all know, the constant investment of enormous sums of new capital. Any of our roads can go to one of the locomotive plants and buy a more powerful locomotive than anything we have got. But after we get that locomotive our troubles will just begin, because the rail has to be adequate, and what supports the rail, and we know that the stalls in the round houses have to be adequate and the turn tables and the coaling stations and water supplies. And after all those things have been fixed up, then our sidings have to be lengthened and our yards have to be enlarged and terminals increased to take care of the

longer trains these bigger locomotives will haul. So that in order to achieve the original economy for which you ventured on an improvement, there is a whole circle of things brought in which has to be correspondingly enlarged. I call that the circle of improvement. It is something that can not be gotten through in a year, perhaps not in a decade, but the fact that we have gone through that three or four times since the railroads began, explains why the average freight rate is 1.1 cent a mile while in France it is $4\frac{1}{2}$ cents and in Germany 5.5 and in many other European countries 6 and 7 cents. It is this dynamic character of efficient railroading which gives a tremendous public importance to an adequate earning power of our industry, because only by an adequate earning power can this shower of new capital be made to come.

And after it does come, when we get earnings to justify and maintain them as a ceaseless process, who gets the material benefits? The people who put up the money? No. They get at best only the going rate of money. All the value of this increased efficiency and economy of operation goes to the public in service, and a substantial part in increased wages to the employes. Because, with no discourteous intent toward the labor leadership of our men, I think it is perfectly clear that the people who have really raised the wages of the railroad employes are their management, which by increased investment in motive power and cars and track have distributed their usual sources of labor over a steadily increasing tonnage and out of the surplus so produced have been able to pay them a higher wage.

There is one other point that will have a direct bearing on earning power and traffic of the railroad industry in the future and that point is the attitude of the public toward competitive means of transportation. A curious thing about man is that he never quite catches up with his times. He is always carrying over from a prior era ideas which may have been true in times past, but which are utterly untrue today. This is a time when rail transportation is on trial, which is the most economic and efficient transportation served to modern society. That trial ended a long, long while ago, yet we still have a very broad and large circle with the idea that the way to cheapen transportation is to multiply competitive agencies of transportation, that some how or other water transportation is infinitely cheap. Yet, excepting when it is a pure gift of nature, it is not cheap at all. A month ago the Superintendent of Public Works

of New York startled the state by admitting this perfectly plain economic fact that if the State of New York had never spent a cent in enlarging the Erie Canal and had paid out of the state treasury full freight rates on every ton of freight moved on that canal, it would have saved barrels of money. There isn't a ton of freight ever moved on the Erie Canal on which the cost to the State Treasury was less than \$4.50, and during all this period the highest freight rate charged by our railroads from New York to Buffalo was only \$3.70, so that the truth is, water transportation is not cheap. It is no competitor of the railroads, and the best proof is that it can not perform its function any place unless it is subsidized out of a public treasury and not required even to meet its operating expenses. I say that, because if in the next ten years we could get the people of the United States to understand that the modern railroad is the cheapest transportation servant modern society ever had, that it is capable of expansion to a degree not yet realized, by which it can handle the increasing volume of traffic at a much lower increase of labor and capital cost, therefore from the point of view of society itself it is best served by giving to us every ounce of traffic that legitimately and economically belongs to us.

Aside from those things, the greatest danger of an adequate earning power to our railroads today is nothing but this rising tide of indebtedness and taxation on the part of our state and local governments. We have all had our eyes fixed on Washington for some years. We are proud that the national government has reduced our national debt by \$4,000,000,000. Very few seem to wake up to the fact that while the national government was doing that, our state, city and county governments have increased their debt over \$6,750,000,000, so the total public debt is at least \$2,500,000,000 higher than it was in 1919, at the peak of our war debt.

Then we think it is a wonderful thing that the federal government decreased running expenses \$2,000,000,000 a year. We have not looked at the other side of the ledger where we read that our state, city and local county governments have increased their running expenses over \$2,000,000,000 a year and are still increasing, so the total tax burden of the people of the United States is higher than it was, and almost 40% of our national expenditure, more than 20% of city expenditure, and 10% of the state expenditure are just trying to pay interest and amortization upon outstanding public debt. And that public debt during these past five years our states have been going into debt

twenty times as fast as they were going into debt before, and the counties and cities four and a half times as rapidly as they were before the war.

So it is not surprising that 1925 was the fifth year out of six in which railroad taxes exceeded railroad dividends by a substantial margin. Almost four-fifths of railroad taxes are levied by state and local governments. They are levied in the main upon the tangible property of the railroads. They are just the same taxes that fall on the farmer on his land and buildings, just the same taxes that fall on the manufacturer on his plant, just the same taxes that fall on the merchant and his store, just the same taxes that fall on the home owner and his home, just the same taxes that fall on the tenant, whose rent must include the taxes paid by the landlord.

The railroad interest is not asking for any special favors of any kind. It expects to pay its taxes like any other good citizen. But has not the time come for all of us to realize that there is no such thing as a substantial reduction in the cost of living for any of us until we bring our states, our counties and our cities, our villages and our school districts, down to a more normal scale of expenditure? And there isn't anything the officers or employees of the railroads can do as citizens during the next few years that will more redound to the benefit of the railroads, and equally to the benefit of the individual, than to express themselves effectively as citizens in favor of a return sane, sensible standards of public debt and public expenditure in our state and local governments.

In conclusion, if anything I said on the subject of valuation struck you as somewhat pessimistic, I want to disabuse your mind of that impression. I believe our managements are looking to the future, not only with high courage, but with the greatest optimism and confidence I have ever known. We all know that the age of exploitation for us and for a good many other industries, is all over. We are just about finishing our age of punishment—some of it deserved, but we are standing in the opening year of a new era, a new period, a period of co-operation in freight rates. In this period we can look to the heads of these railroad systems for prompt and voluntary respect for every public right and every public obligation. I am confident also that we can look to our government and to our fellow citizens for an increasing respect for us in right policies, in conduct and personal attitude to our property values, and in returning to us as we earn it a decent return upon that prop-

erty. And I submit to you that this new period, this new thing which we are now planning, will be the only thing which is really worth the ideals of a great, self-reliant, self-governing American citizenship. I thank you.

PRESIDENT: Gentlemen: When we were at dinner about six o'clock Mr. Binkerd asked for an idea as to our line of procedure and I outlined to him as best I could what we did, and wound up by saying that at the conclusion of the address by the speaker we usually had quite a discussion. He very quickly stated that he was glad of that. Since listening to him I do not wonder that he would welcome any discussion or any questions about anything he may have said or almost anything that pertains to the railroads or public welfare.

I am somewhat familiar, as most of you are perhaps, with many of the things he spoke of. He has given me a new line of thought, and I believe the same is true of all of you. In view of the interesting and inspiring address I believe we should have a very lively discussion and I will ask Professor Endsley to start it.

MR. L. E. ENDSLEY: Mr. President and Members of the Railway Club of Pittsburgh: I can well appreciate that the speaker of the evening would like to get up an argument with somebody on the other side. I am free to say that I am not on the other side, I am on his side. Away back in 1913 I was attending the Western Railway Club meetings and the subject of valuation of railroads was brought up before that Club in a little informal discussion and it was agreed that they would find that there was not as a whole much watered stock, and I did not believe they would find it then and I do not believe they have found it. I was interested then in railroads and anything that made life more interesting and enjoyable, and the railroads have certainly done that for the people of the United States and I think you all agree we ought to pay them for this service. The speaker of the evening covered the subject well. It is too bad that such a wonderful statement of facts as we have heard tonight cannot be brought home to the entire public, so that enough money can be given to the railroads, whereby they can make themselves equal to the ever increasing demand that is going to come upon them if this country is going to progress in the future as it has in the past.

PRESIDENT: We would like to hear from a gentleman

who spent a good many years in the railroad game but had enough good sense to get out of it, Mr. Wildin.

MR. GEORGE W. WILDIN: Mr. President, I do not know how you can expect me to follow the speakers who have just finished and add anything to what has been said by either the author of the paper or Professor Endsley. I do want to say this, however, that the speaker has given us about the clearest exposition of the exact facts I have ever had the privilege of either hearing or reading.

As the President said, I am not a railroad man anymore. But I am interested in the railroads getting along well because if they do then our business is all right, and if they do not our business is all wrong. We are in the same position as everybody else in this country. It is not only the manufacturer, but every citizen in this country who is affected by poor railroad business.

I cannot add anything to what the speaker has said, and I don't want to ask him questions because I am afraid I will expose my ignorance; I, therefore, leave it to somebody else.

PRESIDENT: We have heard a couple of gentlemen comment on the address of the evening and I am now going to ask for a couple of volunteers.

MR. H. W. LEHR: I would not attempt to say very much on the splendid speech that we have heard tonight, but some of the cited methods of figuring remind me of a case we had some time ago, it was after we had emerged from the war and the railroads were trying to get back on their feet and eliminate the lost motion. One of our fellows, who was a Car Oiler, hearing about the reductions that were being made went to his Foreman and said, "Look here, I can help to reduce the force; there is no use of two men working on the job that I am on, because I can do the job myself." The Foreman said, "You are just the kind of a fellow we are looking for." Then when pay day came along this fellow wanted to know where the other fellow's pay was as he thought when he was doing the work of formerly two men he should get the other man's pay. This was his method of reducing expenses and, to all evidence, that is the way some of the people figured water way transportation as competitors of the railroads.

MR. A. STUCKI: I am very glad to be here tonight and refresh my memory on some things I used to know. The

speaker in talking about the railroads certainly brought out many thoughts and many facts showing that great credit is due them. Possibly the best way to prove this in another way is to compare the railroads of this country with the railroads of the other parts of the world. Take, for instance, comfort offered while traveling and I can assure you that there is nothing equal to that enjoyed while traveling in America.

When considering economy of operation, the contrast is still more remarkably in favor of the American railroads. The capacity of our equipment is much greater, also the number of trains and the train loads. As the speaker has said, freight rates are much higher abroad than here, and, strange to say, their passenger rates are also higher than ours. This is true without taking into account the rate of exchange in money.

Then again Europe started railroading before we did and yet engineers and railroad men come almost daily from abroad to study our methods and results, although our country is the youngest of them all. Is this not a most striking proof that our railroads are efficient?

PRESIDENT: I notice Mr. A. E. Anderson in the room. We would like to hear a word from him.

MR. A. E. ANDERSON: Mr. President, I heard the speaker some years ago when he was here, before one of the civic clubs in this room and I remember very well the intelligent discussion he gave of the subject at that time. Since that time the railroad world has progressed very intensely. That was before the war, so the subject as he discussed it here tonight shows how thoroughly familiar he has made himself with all the development that has happened since and particularly with the efficiency and the speed with which traffic has been handled in the last few years.

So it brings up the one question which I have often submitted and that is the question of the saving in interest upon the values in transportation resulting from this saving in time. For there was a time when it took days for a railroad car to travel a very short distance. Now apparently the time has been cut down so the manufacturer as well as the dealer can count upon prompt service and so reduce the amount of money necessary to carry his stock. As the speaker has said, it has been one of the most marvelous developments we have ever had. I would like to have the speaker add his estimate of that saving.

We all know what the development has been on the question of track construction, on the question of operating power, so that nothing can be added very much to what the speaker has given in so much detail. I think it will make a very historic paper when it appears in the Proceedings. It is a fact that because of this efficient transportation it has put this country at the head of the world, you may say, on the question of efficiency as shown by a comparison of rates. Therefore it is simply a matter of hewing to the line, as we say, for the railroads of this country to continue the methods which they have adopted up to this time.

PRESIDENT: I see by the registry cards, we have Mr. W. S. McAbee, General Superintendent of the Union Railroad, with us. We would like to hear from him.

MR. W. S. McABEE: Mr. President and Fellow Members, there is nothing I want to add to what the speaker has said this evening other than that I have just returned from Washington from a hearing in connection with valuation, and their evident endeavor is to cut down prices and costs in comparison with what we believe we ought to have in a justifiable valuation. They will agree with you that theoretically the principle of your valuation is correct, but they add the proviso that the Commission can not agree to that because they have concluded otherwise, and you are forced to accept their verdict.

PRESIDENT: Mr. L. K. Porter, salesman Highway Service Co., may we have a word from you?

MR. L. K. PORTER: That title does not quite fit, for I am not in the highway service, that is, I am not in the business in any way connected with the railroads. I am an automobile merchant. But I have certainly enjoyed the statistical speech of the speaker of the evening and it has broadened me out, because I used to think the railroads got plenty of money. It brings me around to a different attitude.

PRESIDENT: We have the Secretary here sorting out the names of those we think might offer some interesting remarks on the paper. It seems to have worked pretty well so far. Mr. Graham Lee Moses, Engineer Westinghouse Electric & Manufacturing Co., may we hear from you?

MR. GRAHAM L. MOSES: There is nothing I could say that would add to Mr. Binkerd's talk this evening, except that

I am sure there is not one of us here tonight that is not interested in the subject, and not one of us that has not a broader conception of the subject since hearing him.

PRESIDENT: We all like to hear from an Irishman. We have in the room one that I happen to know quite well. Furthermore, he is very much of a student of matters pertaining to railroads and I am sure he can say something that will be of interest. Mr. J. L. O'Toole, Superintendent of Transportation, P. & L. E. R. R.

MR. J. L. O'TOOLE: During the many years of my employment in the railroad field of endeavor it has been my practice to read every article coming to my attention dealing with the subject, so called, of "What is the matter with the railroads?" but I can truthfully say that not until tonight have I ever listened to or read a more able, learned and illuminating presentation as has been given to us by the speaker of the evening. As a railroad man, what impressed me most was Mr. Binkerd's reference to one big result accruing from the general speeding up and increased efficiency of our railroads as represented by the staggering total amount of liquid capital which has been released from our industrial pursuits and is now available to otherwise extend and improve our country's welfare. I think the Railway Club of Pittsburgh is to be congratulated in having a man of the Speaker's ability to come here and give us the benefit of his authoritative and comprehensive knowledge of the subject.

PRESIDENT: I was criticised at the last meeting for having so many new applications for membership from the ranks of the P. & L. E. I think I have been justified. So I am going to call on another officer of the Lake Erie Railroad, Mr. John E. Hughes.

MR. JOHN E. HUGHES: The first lamb has been slaughtered. Here comes another. Mr. President and Gentlemen: Back in the row where I was sitting everybody had a good word to say about the splendid address given this evening. There was one question that loomed up back there, if the speaker cares to answer it, and that is, how was all this efficiency brought about in the last few years?

MR. BINKERD: Roughly speaking, when the railroads were returned at the end of federal control they had operating expenses at the least calculation 100% higher than they were in

1915 and they had a level of freight rates which was only a little over 50% higher than it was in 1914. In other words there was a gap of 50% in every department of cost of producing transportation over the increase which you could charge for that transportation. I agree with you that the bridging of that gap was one of the most amazing problems in our history. The means used are fairly simple in a way, yet they would utterly fail to explain it unless you could conceive of the great body of railroad officers in this country putting their shoulder to the wheel in a most extraordinary fashion. That is a human element to which every railroad man in this room contributed, which has in it nothing but that spirit which leads men to do better than they have ever done before.

But roughly speaking this is what happened. The unit cost of operating a train had been more than doubled. The labor cost of moving a ton of freight was as great as was the whole freight rate in 1916. There was only one solution. That was to increase the amount of traffic that you moved with your unit. So you say those railroads arranged to raise over \$1,200,000,000 new capital. What did they do with it? They bought over 700,000 new freight cars. They used those cars to push off the railroads the light cars. They bought over 10,000 new locomotives, and those pushed off the railroads the older, lighter locomotives that could not haul so many cars in a train. In five years we have added 8 cars to the average freight train in this country; we have added about one ton to the average car load. Then we highballed just as many trains as we could. We cut out every intermediate yard operation we could. We doubled locomotive runs throughout the country. You may know that whether a locomotive run is 100 or 200 miles, there is a certain amount of inspection and care that must be given to it. We enormously decreased the amount of hosteling in our round houses, so we were able to haul the same amount of traffic with a smaller number of locomotives and out of that saving in locomotives we built up a surplus of locomotives in good order running from 400,000 to 500,000. Another of the minor economies is 20,000 tons of coal. And a freight car in this country does just about twice as much work as it did in 1915. We have no more freight cars than we had five or six years ago. We have fewer locomotives. But by tremendously increasing the output of each unit, by distributing the unit cost of operating a train over a greater volume of tonnage, moved a greater distance, we have minimized the effect of these high costs on each

unit of transportation. From one point of view the railroad now, after five years of effort are just about providing the economic justification of wage levels that were imposed upon them five years before they could be justified from the income of the operation. But last year we earned \$1,136,000,000, about 6% on the tentative valuation of the railroads by the Interstate Commerce Commission at the end of 1919. They put in 14,200,000,000 new capital and on all that new capital we have as yet to earn a penny of return. But the railroads are in position to turn future increases in volume of business into net, and that is the hope and justification tomorrow for this investment. And it is the protection of that ability that the railroads need at the hands of their officers and their employees and their fellow citizens and the government.

PRESIDENT: We would like to hear from Mr. Henry Gilg.

MR. HENRY F. GILG: I am not competent to talk on any of the matters Mr. Binkerd presented to us, unless it be the point of taxation. I know what it costs me in taxes. Everybody else knows it, therefore I will not discuss that question. But I have something which may interest all you gentlemen, and possibly railroad men elsewhere. I will quote from a man, who a great many years ago, when the dams were proposed on the Ohio River. This man was a steamboat owner and a coal man, and said it would not work. He said: "The railroads are taking business away from us now because they can haul it cheaper than we can. The trouble with these people who want dams on the Ohio River is, that they are all banking on the coal tonnage that we haul down the river and by the time the dams are completed the mines along the river will be depleted. And even if the mines were not worked out we could not take the coal down the river because we could not take it in acres and we would have to break the tow at every dam, which would make it uneconomical." Those were not his exact words, but that is the purport of what he told me and some other young men at that time.

The consensus of opinion among the members of the Club present tonight, judging from the expressions given in the discussion, is that we have had a very fine exemplification of the railroad situation as regards valuation and we all appreciate it. Therefore, I would make a motion that we give Mr. Binkerd a rising vote of thanks in appreciation of his able address.

The motion was seconded and prevailed by unanimous rising vote.

There being no further business, upon motion, adjourned.

J. D. CONWAY, Secretary.

STATEMENT OF THE OWNERSHIP, MANAGEMENT,
CIRCULATION, ETC., REQUIRED BY THE ACT
OF CONGRESS OF AUGUST 24, 1912.

STATE OF PENNSYLVANIA }
COUNTY OF ALLEGHENY } ss:

Of Official Proceedings—Railway Club of Pittsburgh, published Monthly, except June, July and August, at Pittsburgh, Pa., for April 1, 1926.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared J. D. Conway, Secretary, who having been duly sworn according to law, deposes and says that he is the Editor and Publisher, of the Official Proceedings—Railway Club of Pittsburgh.

Publisher Official Proceedings—Railway Club of Pittsburgh.

Editor, J. D. Conway, 515 Grandview Avenue, Pittsburgh, Pa., (19th Ward.)

Managing Editor, J. D. Conway, 515 Grandview Avenue, Pittsburgh, Pa., (19th Ward.)

Business Manager, J. D. Conway, 515 Grandview Avenue, Pittsburgh, Pa., (19th Ward.)

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J. D. CONWAY.

Sworn to and subscribed before me this 22nd day of March, 1926.

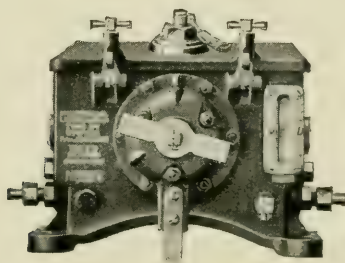
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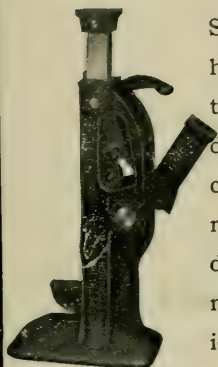
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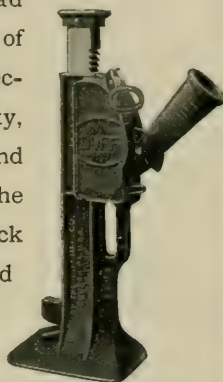
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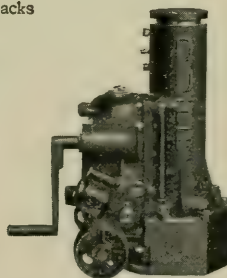
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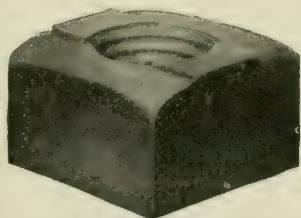
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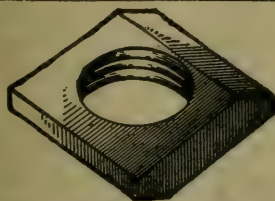
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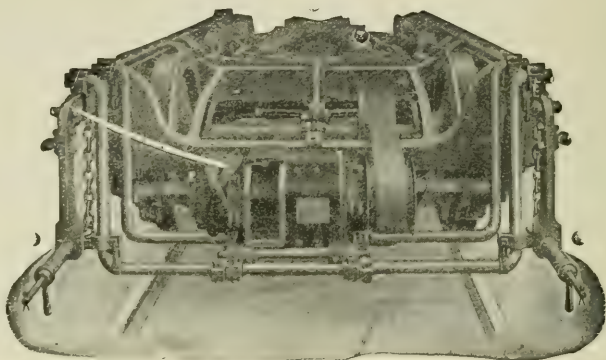
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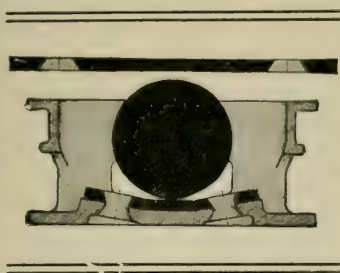
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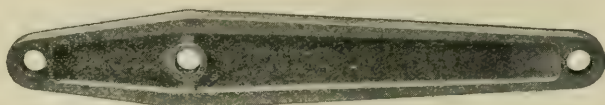
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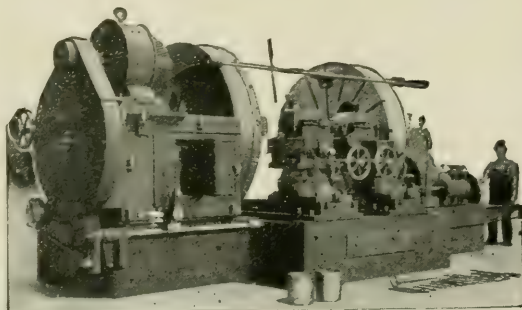
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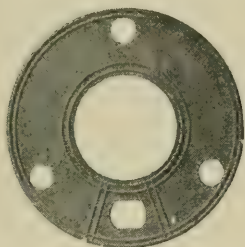
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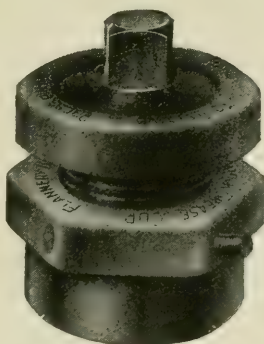
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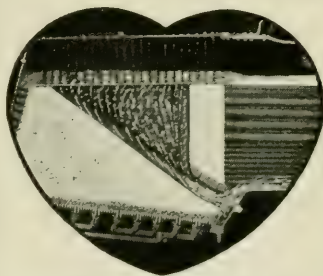
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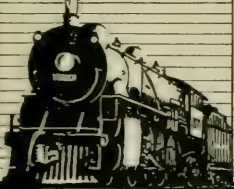


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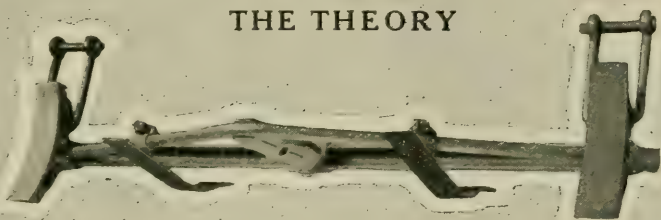
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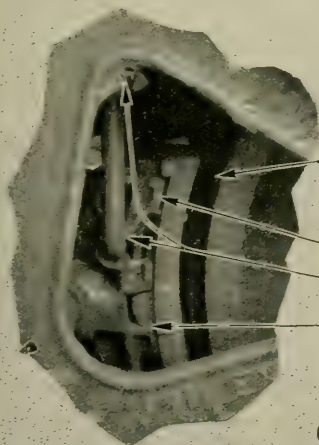




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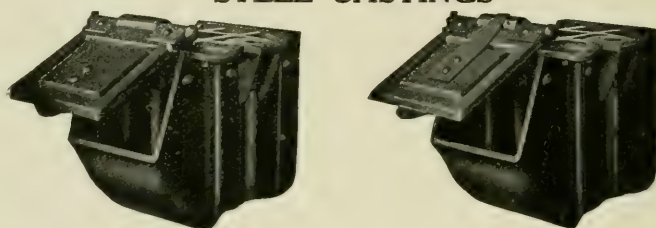


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*H. W. WATTS	November, 1907, to April, 1908
D. J. REDDING	November, 1908, to October, 1910
*F. R. McFEATHERS	November, 1910, to October, 1912
A. G. MITCHELL	November, 1912, to October, 1914
*F. M. McNULTY	November, 1914, to October, 1916
J. G. CODE	November, 1916, to October, 1917
D. M. HOWE	November, 1917, to October, 1918
J. A. SPIELMANN	November, 1918, to October, 1919
H. H. MAXFIELD	November, 1919, to October, 1920
FRANK J. LANAHAH	November, 1920, to October, 1921
SAMUEL LYNN	November, 1921, to October, 1922
D. F. CRAWFORD	November, 1922, to October, 1923
GEORGE D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

May 27, 1926

The meeting was called to order at the Fort Pitt Hotel, Pittsburgh, Pa., at 8:00 o'clock P. M., with Vice President George W. Wildin in the chair.

The following gentlemen registered:

MEMBERS:

Adams, F. W.	Grounds, W. H.
Allen, Harvey	Hackett, C. M.
Ambrose, W. F.	Hale, Charles E.
Angstadt, Edward D.	Hale, O. R.
Bailey, Frank G.	Hansen, William C.
Balzer, C. E.	Hoffman, C. T.
Boyle, Edward A.	Holmes, E. H.
Braun, O. F.	Hoover, J. W.
Brinkhoff, W. H.	Hoover, R. C.
Brown, F. A.	Hughes, J. E.
Brueckner, A. J.	Hulick, E. G.
Burel, W. C.	Jacobs, M. H.
Calahan, Charles R.	Johnson, E. A.
Campbell, James E.	Jungbluth, Adolph
Campbell, J. T.	Karns, C. A.
Carlsson, John	Kempton, J. W.
Champion, James H.	Ketterer, Fred P.
Clark, C. C.	Kimling, Karl
Connally, E. V.	Klue, Henry
Coulter, A. F.	Kummer, Joseph H.
Courtney, H.	Leck, A. H.
Conway, J. D.	LeGoullon, Frank
Crawford, D. F.	Lehr, Harry W.
Davis, Charles S.	Lingle, C. M.
Deckenbaugh, Andrew L.	Lobez, P. L.
Dierker, R. H.	Lohr, A. W.
Doran, F. E.	Maliphant, C. W.
Drumheller, C. R.	Mann, N. T.
Edwards, C. H.	Manson, A. J.
Elverson, H. W.	Megogney, F. M.
Endsley, Louis E.	Merscher, John
Evans, W. J.	Miller, E. B.
Farrington, A. R.	Miller, John
Farrington, R. J.	Mitchell, Frank K.
Fink, A. J.	Mitchell, W. S.
Fisher, Geo. M.	Moses, G. L.
Fisher, John J.	Mundy, F. I.
Fowler, W. E., Jr.	Mvers, Thomas P.
Fritzky, Vincent	McCarthy, F. W.
Grannis, O. R.	McElravy, J. W.

McGeorge, D. W.
 McIntyre, R. C.
 McLain, J. E.
 McLaughlin, H. B.
 McManus, Charles J.
 McMillan, F. C.
 McVay, W. H.
 Noble, Jesse A.
 Obermeier, L. J.
 Orchard, Charles
 Orndorff, J. R.
 O'Sullivan, John J.
 Palmer, E. A.
 Passino, F. J.
 Peterson, W. M.
 Pfom, E. L.
 Provost, S. W.
 Rauschart, E. A.
 Read, Harry J.
 Reckley, A. P.
 Redding, P. E.
 Redding, R. D.
 Robbins, John A.
 Roberts, J. E.
 Robinson, R. L.
 Rose, A. J.
 Ryan, William F.
 Sanfillip, P. C.
 Savage, J. K.
 Severn, A. B.

Schrader, A. P.
 Schultz, H. P.
 Shellenbarger, H. M.
 Sheridan, T. F.
 Simons, Philip
 Smith, Frederic M.
 Smith, Robert M.
 Stamets, William K.
 Stevens, L. V.
 Strohmer, J. L.
 Sutherland, L.
 Taylor, H. G.
 Thomas, C. T.
 Toussaint, Robert
 Tucker, James W.
 Tucker, John L.
 Van Vrankin, S. E.
 Villee, R. E.
 Walther, C. W.
 Walther, G. C.
 Wheatley, William
 Wildin, George W.
 Winell, K. O.
 Wood, E. H.
 Woodward, Robert
 Wright, O. L.
 Wynn, Charles A.
 Wynn, M. E.
 Young, F. C.
 Zollinger, S. W.

VISITORS:

Baker, H. W.
 Bogeich, Joe
 Bull, R. S.
 Denser, J. M.
 Erickson, Anders
 Faunce, B. F.
 Fry, L. H.
 Hoover, J. K.
 Hultman, Carl
 King, William R.

Lewis, Goodrich Q.
 Lewis, S. B.
 Lockard, Ira B.
 McLain, Benjamin
 McLaughlin, T. J.
 Poole, E. P.
 Poole, P. T.
 Richardson, George A.
 Sherback, F. J.
 Starr, A. D.

Wild, Joseph F.

VICE PRESIDENT: The roll call will be dispensed with, the record of attendance being had from the registration cards.

If there is no objection, the reading of the minutes of the previous meeting will be dispensed with, as they are to appear in printed form.

The Secretary read the following list of applications for membership:

- Anderson, N. P., General Foreman, P. & L. E. R. R., Wireton P. O., Allegheny County, Pa. Recommended by J. A. Noble.
- Bjornson, E., Railway Renewal Parts Engineer, Westinghouse Electric & Manufacturing Company, 809 West Street, Wilkesburg, Pa. Recommended by G. L. Moses.
- Doeschler, Louis, General Foreman Painters, P. & L. E. R. R., 323 Foreland Street, McKees Rocks, Pa. Recommended by J. A. Noble.
- Gates, C. F., Assistant Chief Clerk, P. & L. E. R. R., Pittsburgh, Pa. Recommended by J. E. Hughes.
- Houston, Charles, Freight Agent, P. & L. E. R. R. Co., Monaca, Pa. Recommended by J. E. Hughes.
- Lockard, Ira B., Gang Leader, Union Railroad, McKeesport, Pa. Recommended by John J. Fisher.
- Painter, Charles Leroy, Engineer, Westinghouse Electric & Manufacturing Company, 419 Robinson Street, Pitcairn, Pa. Recommended by G. L. Moses.
- Roberts, A. L., Sales Engineer, Railroad Division, United Alloy Steel Corporation, Canton, Ohio. Recommended by John L. Smith.

VICE PRESIDENT: Is there any further business to be brought before the Club at this time? If not, we will proceed with the paper of the evening. We have with us this evening, Mr. George A. Richardson, Manager, Technical Publicity Department, Bethlehem Steel Company. He is going to address you on the subject "A Century of Car Manufacturing Progress." A century is a long time. I was not acquainted with Mr. Richardson and I had in mind a much older gentleman, considering the one hundred years that he is going to cover. It takes a rather extended experience to cover a period of that kind. You will find Mr. Richardson a very young man, yet he has a hundred years' knowledge, where most of us have only about twenty-five. I take pleasure in introducing to you Mr. Richardson, and he will present his subject:

A CENTURY OF CAR MANUFACTURING PROGRESS

By MR. GEORGE A. RICHARDSON, Manager, Technical Publicity
Department, Bethlehem Steel Company, Bethlehem, Pa.

Under the above heading, Mr. Richardson gave the members a talk which dealt with manufacturing methods of a hundred years ago in a brief way, and for the most part, given over to the subject of modern mass production methods and manufacturing equipment used in building steel freight cars of all types and kinds. Eight reels of unusual moving pictures, photographed and edited under the direct supervision of the speaker's own department, did much to enhance the value of his very complete and detailed talk.

Room in this publication does not permit of reproducing the entire text of the descriptive matter, which required a full evening for its presentation. Furthermore, it is available in printed form in references readily accessible to anyone, and hence, in the following pages only the more important and interesting features will be briefly touched on.

The opening part of Mr. Richardson's talk was largely given over to an historical account of the development of car building practice, and also to a short description of passenger car building practice, with a view to furnishing, by way of comparison, some idea of the tremendous advances which have been made in manufacturing methods.

Ninety years ago, or to be exact, in 1835, three ambitious young men made an extensive and exhaustive investigation of the methods then used by manufacturers of stage and railway coaches throughout the New England section. Railroads still were a new though promising possibility. They found that most of the shops were merely frame sheds in which the rough, old-fashioned four-wheel cars were being constructed.

As might be surmised, all three young men were of a progressive turn of mind. They believed there was room for marked improvement in the more or less primitive methods of building the equipment, as well as in the arrangement of the plant required. Two of the young men, Mahlon Betts and Samuel N. Pusey, formed a partnership for the purpose of building railroad cars. This was in 1836. Erection was begun on a three-story brick building at the corner of Front and Tatnall streets, Wilmington, Del., and production soon started. A year later Samuel Harlan, Jr., who had been the third member of the investigating party, was taken into partnership.

This was a period of transition. The original idea of using modified stage coaches for cars, a very humorous version of which was shown in the moving pictures where a train of these coaches is hauled by one of the old type locomotives, was being gradually discarded and within a couple of years we find the beginning of the modern style of car building. It was another example of the thing which happened in our own day in the development of the automobile. The first automobiles were very properly "horseless carriages," and it was not until after the first few years of development that the builders broke away from the carriage idea, and introduced an independent design better fitted for the new motor propulsion.

The new building erected by the partners little resembled a shop used today for manufacturing railroad cars of any kind, and yet it sufficed to take care of the available business of that time and was considered an up-to-date plant. In the basement were placed the blacksmith fires, at which the iron was forged for the cars, which were built on the upper floors. Here, also, the trucks were framed and finished in a small area divided off from the rest of the floor space. On the first, second, and third floors the business of car building was carried on in all its branches. The few woodworking tools of the day, with work benches, were distributed mostly about the second floor, while the upholstery room and other divisions of the business occupied the remaining spaces not required for the erection of car bodies.

The floor of the second story of this shop was laid in large traps through which the completed cars were lowered by blocks and falls to the ground floor, where they were painted and varnished for delivery. The entire building was 60 feet wide by 100 feet long, but the standard car length of that time was only about 32 feet, so that plenty of room was available.

The new firm built in the first couple of years of its existence 109 four-wheel cars and 67 eight-wheel cars, a good record, considering the facilities available, but one that, considering the size and design of the cars, would amount to little today. The plans were little more than rough water color sketches, bearing, for the most, a few major dimensions, everything else being left to the builder. This concern not only made a bid for local business, but also published a very elaborate circular in 1839 for the purpose of advertising to foreign countries, and were successful in this venture also.

From these early pioneer days to the present, as a result of a rapid increase in tonnage and the consequent problems con-

fronting the railroads, the change in type and capacity of equipment has been going on continuously and even at the present much is being done in the way of simplification, efficiency and increased carrying capacity of the equipment.

In recent years the interchange of ideas and standardization of equipment has helped very materially the production of cars suitable for general use. Many firms have entered into the manufacture of railway equipment. These manufacturing plants have grown to immense proportions capable of handling the business with a high degree of efficiency. With large organizations of highly trained men and special machinery they are producing this equipment under keenly competitive conditions which result in low prices. The day of the small producer has passed. Unit production, by necessity, has given way to mass production, and this is particularly true in the case of freight cars. As a matter of fact we find it desirable to segregate passenger car work because of its highly specialized character and demands for finish, which call for a great amount of time. Hence we find that the old firm of Betts, Pusey and Harlan, which, after passing through several changes in organization, during the course of which it was known for a long time as Harlan & Hollingsworth, was finally acquired by the Bethlehem Shipbuilding Corporation in 1911, and came gradually to specialize on passenger car building, and still continues to do so.

After showing the old-time railroad train, some reproductions of old drawings and photographs were shown. These included pictures of the original shops of the Harlan Plant, a reproduction of the illustration at the head of the circular published in 1839, the Tioga Railroad car, built in 1840 and said to be the first one of the really modern type of passenger cars; an old drawing of one of the early types of cars, the original of which is painted in water colors, and interesting examples of other cars built down to the present time. A rather striking illustration of the change in manufacturing practice and methods of handling business is exemplified by an old photograph labeled "Wagner's Drawing Room Car," on the back of which, in a single-page hand-written letter, are the complete specifications covering an order for two sleeping cars 56 feet long.

On the same reel, pictures were also shown of the present Harlan plant, and a few of the different stages in the manufacture of cars for baggage service. These were particularly shown in order to give some idea of, and describe, the individual char-

acteristics of passenger car building as contrasted to freight building.

About 25 years ago the Cambria car shops at Johnstown, now operated by the Bethlehem Steel Company, and which, like the Shipbuilding Corporation, is a subsidiary of the Bethlehem Steel Corporation, were started. Today we find them to be an excellent example of the very antithesis of the little shop founded by Bettis, Pusey and Harlan almost a century ago. They are a good example of the type of shop necessary to meet the most exacting requirements in the present day freight car building.

The freight car is one of the big factors in railway transportation, and it is in the building of this equipment, the problem of mass production is the most important. The present generation remembers 20 and 30-ton capacity cars, and the rapid change from those to the present types of 50, 70 and even 100 and 105-ton capacity in some cases. Notwithstanding this great increase in car capacity, the total number in service has increased very much more rapidly.

The tremendous demand for freight cars that exists today and the radical changes in the methods of building them have completely revolutionized the methods of manufacture. Larger and more intricate and expensive equipment has called for bigger manufacturing organizations. There are many freight car shops, now in the country capable of taking care of any ordinary demand placed upon them, and some half dozen are equipped to perform any class of freight car building with efficiency and dispatch. The Cambria car shops are an excellent example of this latter type.

Started about 25 years ago, the productive capacity of the Cambria shops has increased until today nearly 100 cars of various kinds can be built every 24-hour day. Originally the work was confined to steel cars of certain types, but with the changes in capacity, provision has been made to handle any type of car for freight service, whether all-steel, wood or composite. Low cost is a result of mass production. Most persons are familiar with the production methods in the automobile and similar industries, but do not consider the building of freight cars a problem of mass production. It is a matter of fact, however, that methods prevail in the building of freight cars identical with those in the manufacture of automobiles, modified only to meet local conditions.

The car builder has a more difficult problem than the auto-

mobile builder, in that he must not only maintain his production at low costs, but his work is not confined to any one or two types of cars month in and month out. His problem is best likened to that of the fictitious case of an automobile builder who, while adhering to present mass production methods would at the same time have to be prepared to build a low priced automobile today, a middle class one tomorrow, and one of a higher grade at a later date. All the problems must be met and solved without changing the flow of production, a thing which is practicable, because the ability to shift has been taken into consideration. The equipment provided must be of as nearly a universal type as possible.

Proper facilities for the storage of materials are important. The flow of materials must follow the same channel regardless of the type of car being built. The endeavor of a large producing organization giving its time and energy to the single purpose of freight car production can be likened to an automatic machine in which each movement follows the preceding one with regularity and exactness. Starting with immense stores of raw materials, many hands and numerous machines transform the inert masses into a symmetrical and useful commodity.

In the modern car shop one witnesses a feat which is impressive. One sees the various parts moving rapidly together and combining with the regularity of clock work into one whole in a length of time almost inconceivably short. Imagine, for a moment, that in the Cambria car shops one freight car is completed every 15 minutes during the working day, and that rate is kept up day in and day out during the entire time the current order lasts. It is fascinating to see the various parts going together and moving from position to position. Starting from the very beginning the immense piles of raw materials are transformed into trucks, underframes, bodies and complete cars with a dispatch that would have seemed marvelous 20 years ago. This rapidity is due to a complete and careful subdivision of work into position operations and the concentration of the maximum amount of labor that can be used most economically in every position. Often 1,000 men are employed in the two erection shops at Cambria.

Bethlehem Steel Company is in a unique position as regards the manufacture of cars because it is the only plant of its kind in the country that produces the materials for car manufacture as well as building the cars themselves. Everything that goes into the building of cars, with the exception of a few castings,,

and patented specialties, which have to be obtained outside, is made by Bethlehem. This includes such diversified products as bolts, nuts, rivets, plates, shapes, rolled steel wheels, axles, and pressed and drop forged parts. The Cambria plant of Bethlehem has done a great deal of pioneer work in the development of intricate pressed and forged parts for car building purposes.

The entire Car Shop Division has been laid out with a view to obtaining, as nearly as possible, a constant flow of material from the production and assembling divisions to the erection positions. Not only this, but the splendid results which are being obtained today are the outcome of a well thought out, systematic and scientific plan of action in which numberless striking changes in methods have been introduced.

Recently, the Bethlehem Steel Company completed a very interesting car building job, which is an excellent example of mass production methods on a large scale. The particular car in question was a steel box car with inside wooden lining, for the Pennsylvania Railroad. The construction of this car marked a big departure at the Cambria shops, for it had long been a policy to restrict operations to all-steel cars only. At the same time it was an excellent example of the adaptability of the plant and working force, because it meant the building up of a complete woodworking shop force on short notice, and the results obtained were successful in every way.

The actual work of erection was divided between two shops. The steel body was erected and placed on the trucks in the steel erection shops and then the lining was applied in another shop. Inasmuch as the final erection work, however, is only a part of the activities required, it is necessary for us to have some idea of the various units which go to make up the Car Shops Division, and then trace the flow of material and note the various steps of fabricating and assembling.

One of the very important units is that made up of the axle-finishing and truck building departments. These departments produce essential units, which, together with parts from other sources, converge to a common center where the cars are erected.

One of the outstanding features that impresses the visitor to the Bethlehem shops is the housing of these departments and particularly the storage of the various parts used by them of which we mention axles, side frames, bolsters, etc. All this material is placed under cover. The housing consists of a modern steel and brick building 90 feet wide by 740 feet long, which

affords ample space for the storage of all parts and of all machines entering into the manufacture of the trucks.

Approximately one-half of the total area of this building is given over entirely for storage purposes. A standard gauge track extends the entire length of the building and has a capacity of 15 freight cars at one time. Three 10-ton overhead traveling cranes provide the necessary facilities for unloading material directly from the cars to the stock piles without rehandling.

Another thing which arouses the admiration of the visitor is the safe and orderly way in which all the various parts are piled. The storage space is equipped with beds made from heavy I-beams set in the floor. These steel beams afford a suitable foundation for storing heavy material. Twenty-inch I-beams are used. It has been found that these beams will just fit a 33-inch freight car wheel when the wheels are piled within the flanges of these beams. This method of piling guarantees the alignment and stability of the wheel piles and at the same time makes it possible to build up very high piles, thus giving a large storage capacity with minimum use of floor space. The beam beds also afford an excellent foundation for the piling of axles, side frames, truck bolsters and other material entering into truck construction. When axles are being stacked hardwood stringers are inserted between each layer, with bent steel flats placed at the end of the piles, thus allowing each layer of axles to be of the same length. This method prevents the slipping or rolling of the axles and allows them to be piled high with absolute safety even though the ends of the piles are vertical, as can be seen in the accompanying illustrations. Wood stringers are also used in the piling of side frames, bolsters, etc., as a regular practice in order to make the piles safe. As an additional precaution a slight camber is given to the piles by the proper placing of the stringers.

As a result, one will find an unusually orderly appearing storage layout not at the expense of, but in conjunction with the very decided advantages of increased safety. Greater storage capacity has been provided. Another feature which has not yet been mentioned is the ease of taking inventory. Passage ways are provided between the various piles and this makes it possible to take inventory very rapidly and accurately.

The axle turning department is provided with 12 modern axle finishing lathes. This department is covered by an overhead structure which carries an electric monorail and hoist for every machine. The rough turned axles are deposited by cranes

on a storage bed from where they are transferred by the above mentioned hoist into the lathes. As the axles are finished they are transferred directly from the machines to another storage bed at the head end of the lathes by the same hoist. Here the axles are inspected, gauged and rolled to the end of the bed where the wheels are loose-mounted on the axles by means of monorail and suitable hoist. The assembled wheels and axles are then rolled from this position on steel floor plates of suitable width to a 600-ton mounting press. After the final mounting they are rolled to the end of the truck building bed where they are picked up by means of a small hoist and deposited on rails for the final truck assembly. An important aid in securing production in cold weather is the provision of ample heating facilities which are particularly necessary on account of wet cutting. The indoor storage of the axles and other parts is also a very decided advantage during the winter months. It is a further source of saving time because the workers do not have to contend with the parts being covered with ice and snow, which would be the case when outdoor storage is used.

Car wheels are finish bored, gauged and marked in this shop. Properly selected wheels are then rolled to the end of the axle finishing bed, where they are loose-mounted on the axles, as described above.

The truck building bed is mounted on a cement foundation with heavy I-beams supporting the rails. The top of the rail is approximately 17 inches above the floor line, which affords a comfortable height for the truck builders. The bed is built on a one-half of one per cent grade which permits of an easy movement of mounted wheels and trucks. At the end nearest the wheel mounting press double rails are provided, which permit the overlapping of the mounted wheels, thus giving greater capacity per unit of length. As the mounted wheels approach the point where the truck building begins, these double rails converge to a single rail system by means of an automatic switch.

Side frames, spring planks, bolsters, etc., are assembled on beds adjacent to the building track and the completed truck frames, which can be considered as a sub-assembly, are then swung onto the building bed by means of overhead jib cranes and electric hoists. On the building bed the trucks are assembled and fitted under a position system, constantly approaching the exit where, after the journals have been packed

and the trucks inspected, they leave the building bed on a sharp incline and roll by gravity to the car erecting shop.

Space does not permit of describing in detail the work and equipment of the Bolt and Nut and Forge shops. Suffice to say that everything is laid out in a manner to insure the most efficient operation, and some very unusual jobs have been and are being performed. One interesting example of drop forging practice is the making of drop forged steel center plates under a 27,000# hammer, which is one of the largest in the country. In the way of pressed steel parts a great variety of unusual shapes, normally made as forgings, have been developed. A few of the more complicated types are pieces such as pressed steel striking plates, bath tub bolsters, posts of various kinds, etc.

The Bolt and Nut and Forging departments are not only laid out with a view to securing a plentiful and uniform flow of material, but at the same time they are prepared to handle outside jobs in addition to the work normally called for in the operation of the plant.

While the preparation work is going on, the cars are being erected as rapidly as possible in the erecting shop. Two sets of erection tracks are used in the steel shop, so that two cars are being built simultaneously. The cars are moved up one track and down the next so that the complete body is built in 12 positions. It is then so located that it can be lifted by a crane to the trucking beds where it is placed on the trucks. The routine of assembly is as follows:

Position 1. Units for center sill assembly are brought together here and riveted.

Position 2. Center sill is assembled and mounted on building trucks.

Position 3. Crossbearers, bolsters and end sill diagonal braces are applied.

Position 4. Riveting position. Above parts riveted.

Position 5. Draft gear, couplers, and miscellaneous parts of underframe applied.

Position 6. Riveting position. Also turnover position. Underframe is turned over in order to complete riveting of all of the assembled parts.

Position 7. Ends and sides assembled. Door jig applied. Body squared up.

Position 8. Application of roof.

Position 9. Riveting position.

Position 10. Riveting position.

Position 11. Doors applied.

Position 12. O. K. position. In this position all work is carefully inspected, defective rivets replaced and such other corrections made as may seem necessary. Body is carried by crane from here to the trucking track.

Positions 13 and 14. Trucking track. Body placed on trucks, electric welding, air brake applied and inspection of air brake.

The car is thoroughly cleaned by washing. A first coat of paint is given inside and out. This includes roof and the spraying of the trucks. The body is then ready for the wood application, which in the present case consists of a wood floor and single lining, extending to the top of the car. This is done in the wood erecting shop where wood working machines prepare the lumber. All parts to be applied to the car are made in this shop including running boards and card boards. These all receive a first coat before being applied to the car. Here again position work is an important factor in securing production. The cars are brought from the steel shop and enter the wood erecting shop at the lower end. The cars are moved forward from position to position as follows:

Position 1. Lay flooring. This is more difficult in the present car than normally would be the case on account of the necessity of having to cut and trim around the posts in order to make a tight joint. One of the outstanding features of the handling of this job in the Cambria Shops is the care taken to get an absolutely tight floor. About every four feet the boards are wedged into place and held by bolting down one board. The first gang of men lays the floor as far as to the door posts.

Position 2. Continuation of floor laying. Threshold or door opening boards placed. This work is performed by a second gang which follows right on the heels of the first. This gang lays the boards in place and wedges them apart at the center. The loose boards on both sides are cleated temporarily and the resulting gap is measured. A board is then planed to a width about $\frac{1}{8}$ -inch wider than the width of the gap. The wedges are removed. The two cleated groups of boards are lifted to a pyramidal position, the key board inserted, and then, with the aid of large levers the flooring is forced into place. In this way a tight fit is obtained.

Position 3. Laying out floor for drilling for floor bolts. This is done by a lay-out boy with the aid of templets.

Position 4. Drilling holes for floor bolts. Two drillers with electrically driven drills do this job.

Position 5. Placing and tightening up floor bolts. After the holes have been drilled, two men apply the bolts. At the same time a gang underneath the car is applying the nuts and screwing them tight.

Position 6. Grain sealing. This is done to prevent any possibility of grain leaks. A worker pours a hot asphaltum base sealing compound all around the edges of the flooring. He is followed by another man with a hot calking tool which is used to push the excess compound back into place. This is done with a special tool provided with a light and an electric heating coil, which heats the compound to the desired temperature. The tool was developed in the Cambria shops and Bethlehem is probably the only concern in the country using a tool of this kind.

Position 7. Apply posts. This job consists in applying the side posts and bolting them up. The gang, consisting of six men applies over 600 posts in ten hours, or in other words, an average of more than one post a minute.

Position 8. Side lining boards and end lining boards are applied and wedged into place. Nailers follow and nail the boards.

Position 9. Door post facers apply posts and bolt them in place.

Position 10. Cleaning and inspection. Car is swept out and company inspector goes over whole job carefully.

While this work has been going on inside the car, the running boards, and card boards have been applied to the outside. It should also be borne in mind that while all work is inspected by the shop's inspector it is also constantly being inspected by the railroad company's representative.

From the wood erecting shop, the cars are transferred to the paint shop where they receive a second coat of paint. They are stenciled again, offered for inspection by the railroad inspectors, given an air brake test and finally shipped out.

While position work is a large factor in speeding up mass production, it should be borne in mind that the secret of the uniform and rapid rate of production obtained at Cambria Shops without sacrificing quality, is in some measure due to the use of jigs and templates. One will find an extensive use of jigs in the manufacture of roofs, doors, bolsters, running boards and of other parts, so that every part fits corresponding parts with-

out any time being lost in fitting and adjusting. Even the quarter sections of the sides are jigged.

Another factor which makes for large production, and at the same time makes it possible to make a product of high grade, is the extensive use of gauge and multiple punches.

Seven reels of moving pictures gave an excellent and very comprehensive idea of the activities carried on in the shops at Johnstown. While the wood-lined box cars were taken as a typical example because of the fact that both steel and wood-working was involved, these shops are prepared and equipped to make any kind of an all-steel or composite car for freight and miscellaneous service, such as gondola cars, hopper cars, tank cars, and even mine cars.

Although time did not permit of any description of the facilities of the tank car shop, it is interesting to know that among the more interesting and unusual equipment available are two 23-foot Bull Riveters and a set of bending rolls which are the largest that we have any knowledge of at the present time. These rolls are used for rolling plates, and the top roll, which has a length of 48 feet weighs 146,000 pounds or 73 tons. In the moving pictures, these rolls were shown bending a 40-foot plate, which was destined for the Government Oil Refinery job of the Argentine Republic. The tank work was done at this shop.

It is very difficult for one who has not been in close contact with large and highly developed shops of the kind mentioned, to realize the infinite amount of detail, the amount of equipment and the character of the organization required to obtain successful mass production, which at the same time is characterized by the unusually high quality of the product turned out. The uniform rate of flow, the precision of action, and the way in which each part fits into the general scheme of things, are most impressive. The completeness, however, of the moving pictures, and the unusually fine photographic quality made it possible for those who saw them to get a very good idea of how cars are built in a large shop of this character.

Unquestionably the dominant fact which remains in one's mind is that mass production of this kind, production where accuracy of workmanship, speed, and minimum cost are all considered, cannot be obtained by an organization that is not keyed up and specializing all the time on this class of work. The overhead on the equipment, the trained organization and the fact that only in a general shop can sufficient work be obtained

to keep it going, make it practically prohibitive to consider building cars on a competitive or economical basis, where the organization is small and the work limited. Efficiency of production demands that the amount and continuity of business available be such that there is practically no let down on operations and this is only possible where an organization is catering to a wide range of interests.

VICE PRESIDENT: I am sure you have all appreciated the wonderful pictures which Mr. Richardson has shown, and especially those which illustrate modern methods of mass production in a modern steel car plant. Some of the things which have been shown you, may have interested you to the extent that you may want to know more about the details of their operation. While I have not said anything to Mr. Richardson about this particular matter, I am sure he will be glad to answer any questions any of you may wish to put to him.

MR. RICHARDSON: Ordinarily I am not supposed to be able to do that, but we have with us tonight the foreman and superintendent of the car shops, naturally better qualified than I am to answer questions. He can answer a great many questions about that particular line of work, while I have to cover a very wide field of activities. I have no doubt he will be very glad to help out.

VICE PRESIDENT: We have with us tonight Mr. H. W. Elverson, Works Manager of the Pressed Steel Car Company. It may be that he has some questions he would like to ask.

MR. H. W. ELVERSON: Mr. President, I have no questions to ask. I have been very much interested in the address and the illustrations, and I have enjoyed the evening very much.

VICE PRESIDENT: Has any one any question or comment he would like to make? There does not seem to be any discussion, and the hour is late, so we will not press the matter further.

MR. L. E. ENDSLEY: I am sure everybody here tonight has enjoyed this very interesting talk and the pictures and I move that a rising vote of thanks be extended to the speaker in appreciation of his very interesting and enlightening address.

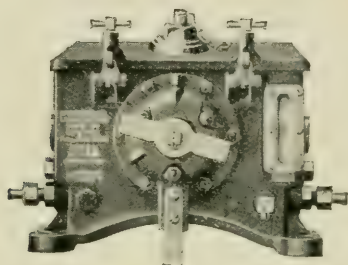
The motion prevailed by unanimous rising vote.

There being no further business, upon motion, adjourned.

J. D. CONWAY, Secretary.

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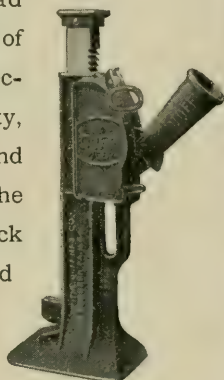


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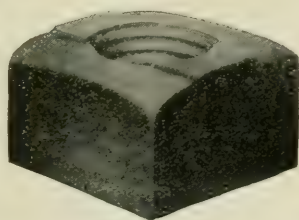
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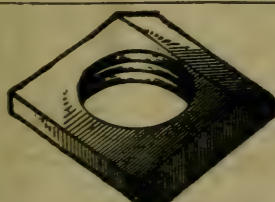
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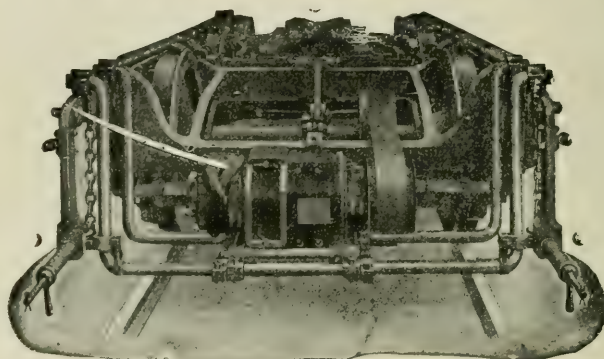
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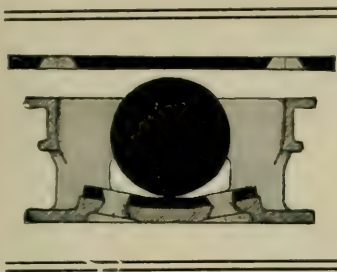
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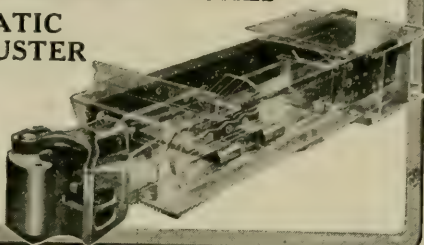
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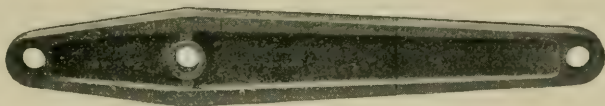
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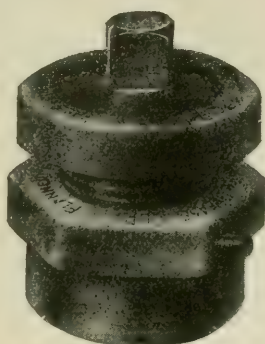
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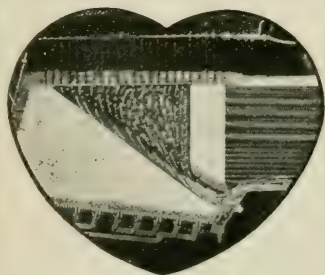
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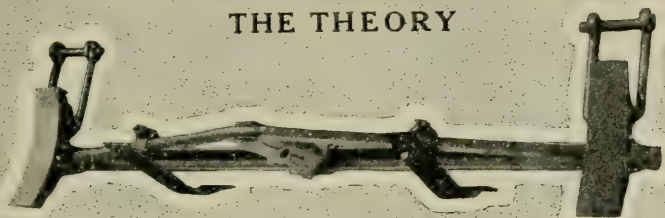
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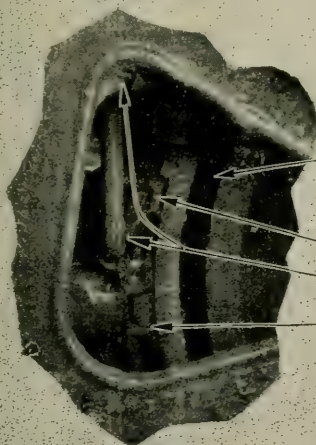




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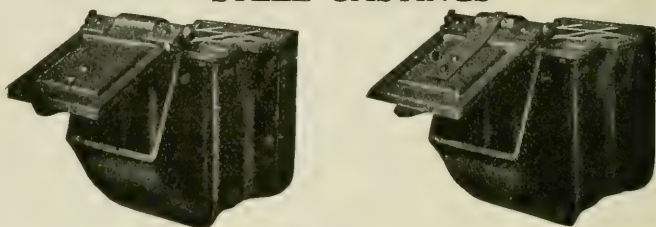


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Pittsburgh, Pa., Sept. 23, 1926

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*F. R. McFEATHERS	November, 1910, to October, 1912
A. G. MITCHELL	November, 1912, to October, 1914
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GEORGE D. OGDEN	November, 1923, to October, 1924
A. STUCKI	November, 1924, to October, 1925

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF MEETING

September 23, 1926

The meeting was called to order at the Fort Pitt Hotel, Pittsburgh, Pa., at 7:00 o'clock P. M. (Eastern Standard Time), with Vice President George W. Wildin in the chair.

The following gentlemen registered.

MEMBERS:

Allen, Harvey	Lappe, J. C.
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Campbell, J. T.	Myers, T. P.
Conway, J. D.	McAbee, W. S.
Coulter, A. F.	McMurray, Arthur E.
Cox, William C.	Orchard, Charles
Daley, John	Painter, C. L.
Dambach, C. O.	Parke, F. H.
Davis, Charles S.	Passmore, H. E.
Doran, F. E.	Patterson, J. E.
Down, S. G.	Prouty, E.
Emery, E.	Provost, S. W.
Fenton, H. H.	Rauschart, E. A.
Fisher, George M.	Ryan, William F.
Fisher, John J.	Sanfillip, P. C.
Furch, George J.	Sattley, E. C.
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Hogg, Francis	Stevens, L. V.
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Houston, Charles	Stucki, A.
Huber, H. G.	Sutherland, L.
Johnson, R. S.	Van Vranken, S. E.
Jones, R. T.	Walther, G. C.
Jungbluth, Adolph	Weissert, W. J.
Kelly, H. B.	Wildin, G. W.
Kindle, W. F.	Woodward, Robert
Lang, W. C.	Wright, John B.

Wynn, C. A.

VISITORS

Brooks, Charles	Kelley, H. W.
Chadwick, V. D.	Lappe, Ross W.
Dahlgren, E. W.	Murray, John
Davis, William B.	Paul, J. W.
Fisher, W. R.	Sauter, William
Hedinger, W. F.	Schrontz, Samuel B.
Hersey, M. D.	Sleeman, J. T.
Hill, H. H.	Smead, George L.
Huckaba, H. A.	Staples, C. W.
Hughes, D. F.	Stark, Frederick
Karelitz, G. B.	Taylor, W. B.

Theile, Fred

VICE PRESIDENT: The roll call will be dispensed with the record of attendance being had from the registration cards.

If there is no objection, the reading of the minutes of the previous meeting will be dispensed with, as they are to appear in printed form.

The Secretary read the following list of applications for membership:

Cox, W. E., Assistant Engineer, Monongahela Connecting Railroad, 5935 Kirkwood Street, Pittsburgh, Pa. Recommended by J. R. Geddes.

Cringle, H. C., Supervisor, Monongahela Connecting Railroad, Dormont, Pittsburgh, Pa. Recommended by J. R. Geddes.

Geddes, D. Y., Superintendent, Pennsylvania Railroad System, 1033 Penn Avenue, Pittsburgh, Pa. Recommended by J. H. Redding.

Lyman, Lynn S., Renewal Parts Engineer, Westinghouse Electric & Manufacturing Company, 1133 Rebecca Street, Wilksburg, Pa. Recommended by G. L. Moses.

McSweeny, E. J. Master Mechanic, B. & O. R. R., Henne Building, Akron, Ohio. Recommended by H. B. Kelly.

Rees, Harry, General Foreman, B. & O. Shops, New Castle, Pa. Recommended by H. B. Kelly.

Sleeman, J. T., Engineman, P. & L. E. R. R., 3303 Francisco Street, Corliss Station, Pittsburgh, Pa. Recommended by H. B. Kelly.

VICE PRESIDENT: These applications will be referred to the Executive Committee in due course, and upon

approval by them the gentlemen will become members without further action than the payment of the current year's dues.

The Secretary announced the death of the following members of the Club: E. L. Chollman, J. H. Rosenstock, D. M. Howe, Grafton Greenough.

VICE PRESIDENT: Appropriate memorial will appear in the Official Proceedings of the Club.

This being the stated time for the appointment of a Nominating Committee, under our rules, I will appoint as such Committee Messrs. E. C. Sattley, Chairman, O. R. Hale and H. B. Kelly, and would request the Committee to confer during the evening and report later at this meeting.

There being no further business, we now come to the paper of the evening. We have with us Mr. M. D. Hersey, Physicist of the United States Bureau of Mines, who will address the Club upon the subject of Lubricants, which will be followed by moving pictures of the process of manufacture of lubricants, also two reels illustrating abrasives.

I take great pleasure in introducing to you Mr. Hersey.

“LUBRICANTS”

By Mr. M. D. Hersey, Physicist, United States Bureau of Mines

Mr. Chairman and Gentlemen: It is a very particular pleasure to discuss the subject of lubricants with the representatives of the railway profession and to meet you personally, because the railroad industry is said to make the most efficient use of lubricants of any industry. Also, I believe the railway industry can be credited with having initiated the first fundamental research experiments on lubrication. I have reference to the experiments of Beauchamp Tower in England in 1883, which were carried out for the Institution of Mechanical Engineers using a 4" journal in a brass bearing which covered about 120° of the circumference, this being very similar to a type of bearing used extensively on railroad cars.

The subject of lubricants is a very broad one, and my relation to the pictures you are to see concerns only the Lubricants, and not the Abrasives.

There are a great many different kinds of lubricants. We usually think of the mineral oils. Besides these, there are the vegetable and the animal oils, which were at one time used

more than mineral oils. Even today it is quite difficult to find a substitute for lard oil. It seems some Englishmen have a patent on making a good lubricating oil by taking a mineral crude and refining it in such a way that you have left a certain amount of fatty acids such as will make it a good lubricant. Some one has beaten that patent, I am told, by taking a crude oil and refining it in such way that all the fatty acids are entirely gone, and then putting back just the right amount. So these mineral oils, and the various imitations of lard oil, are some of the most common kinds of lubricants.

Then there are solid lubricants, and also bearings that run without any kind of lubricant at all, the bearing being made of certain kinds of impregnated wood. Even water has been used as a lubricant; and under certain conditions, it can be shown that water is better than oil. And there are conditions where air is the ideal lubricant, but that would not be on a railroad car wheel.

A lubricant has a number of functions to serve beside lubricating. For instance, you sometimes want a lubricant to prevent rust, or to prevent wear, whereas by lubricating, in the technical sense, we just mean the reduction of friction (i.e., frictional resistance, or power loss). I was doing some work for the Bureau of Mines in connection with the measurement of friction losses in mine cars, and when I was new to that particular game I wondered why they put stiff, heavy grease in some of the roller bearing cars, as it is true that to do so will increase the friction. I was soon put wise to the fact that this was done to keep out acid mine water and to keep the dirt out, etc. Those other things very often have more to do with the selection of a lubricant than have the simple, friction-reducing requirements.

Therefore, there may be two oils that at a certain time today, are equally good for reducing friction. However, one would be selected in preference to the other because of the things I have mentioned—keeping the dirt out, or because it would not corrode the metal, or because it would last longer under service conditions before it would change its properties. And perhaps in railroad practice it would be selected because it would keep its viscosity more nearly the same under the varying temperatures that may be met in a long run.

So if you narrow this subject down to the process of *lubri-*

cation in the strict technical sense, as I should like to do after a moment, you have left only about one per cent of the whole subject of lubricants. I ran across a paper a few months ago containing the best short treatment of the general subject of lubricants that I have yet seen published in the United States. It is very up to date and interesting and not very long, a paper entitled "Lubricants and Lubrication," by James Duguid, published in Mechanical Engineering for November, 1925. There is also a good book published in England by Thomsen on the "Practice of Lubrication."

I shall not have to say anything about the *production* of lubricants, because that phase is sufficiently covered by the motion picture. Coming down to one small corner of the subject, the mechanical lubricating action of an oil film, I will further limit myself to the story of certain research problems of which I have sufficient personal knowledge to be on safe ground.

The history of modern lubrication research begins with those experiments of Tower in England. He made the basic experiments which proved that when you have a fluid film between two metals, the only property of the lubricant that has anything to do with the amount of friction is its viscosity, by which we mean its resistance to flow, the opposite of fluidity.

In the old days, beginning with Tower's experiments, it was customary to make experiments on bearings and to measure friction in relation to a number of variables, the load on the bearings, speed, temperature, kind of oil, the size of bearing, amount of clearance between axle and bearing, etc. I made some experiments in 1909 to carry that subject just a little farther, and when I got through I had a lot of observations on a bearing which I had lubricated with three or four different kinds of oil and had run at speeds ranging from moderately low to pretty high, and with a variety of different loads and different rates of feeding the oil in; and now I had the job of plotting the curves to represent those results--curves to show the variation in friction with five or six different variables. I had to have 21 charts, each of which would have a family of curves on it. For some of those curves I had only five or six points, which makes it difficult to draw a good curve. Then I remembered the principle of *dynamical*

similarity, which is a principle of physics frequently used in naval architecture and aeronautics. I will not go into technicalities beyond mentioning that it is successfully used in naval architecture and aeronautics. I thought that by using this principle, and applying it to lubrication in the same way it had been applied in other branches of engineering, I would not have to plot those 21 charts, but could get the whole thing on one piece of paper. With suggestions from Dr. Edgar Buckingham of the Bureau of Standards, who had carried this principle to its farthest development, I was able to apply it to lubrication, and had just as good luck with it as anybody had with those other applications. So I got all these data on one curve by taking as my variable, not the speed or load or temperature by itself, but a certain combination variable, which turned out to be the product of the viscosity (measured in absolute units) by the speed in revolutions per minute, divided by the pressure. Thus I had two variables instead of five or six; and with those two, the coefficient of friction plotted vertically, and the values of this combination variable plotted horizontally, I got a single curve, and all the points fell on that same curve no matter what kind of oil was used. This method has been further applied and more accurately verified by other investigators since that time.

It was, of course, realized that only under fairly good conditions will a bearing run with a thick enough film to satisfy the condition on which the foregoing proposition depends, namely, that the film is a true fluid. It may very often happen that you have such heavy pressures and low speeds that the oil gets squeezed out, and then you have no true fluid film.

Thus we come to the second division of mechanical research on lubricants—trying to answer the question, what property of the oil it is that determines the amount of friction it will give. Up to this point, it is proved that viscosity alone is sufficient. I do not mean the viscosity of an oil in a bottle, but the viscosity of that oil when it is inside the oil film doing business, at which time it is both heated and squeezed, and then its viscosity may be quite different. Of course, you have got to know what is the true pressure inside that film, and what is the temperature, and until such observations can be made, it is not very easy to apply the foregoing theory even though it has been demonstrated to be correct.

Coming down to the subject of what the film is when it is too thin to be any longer a true fluid, what is it then? That line of research has been carried on both in England and France, and to some extent in this country. I have recently been visiting some of the people who are investigating this subject, which we call oiliness, to distinguish it from viscosity. It is believed that two oils might have the same viscosity in the oil film and still give different friction values. Of course, when you talk about two oils having the same viscosity in service this may mean the same viscosity under 50,000 lbs. per square inch pressure and 250 to 500° F, and not simply the same viscosity when tested in a Saybolt viscometer. The results of oiliness investigations seem to prove that the oil is *adsorbed* (not absorbed), which is a chemical action that sticks the oil to the surface of the metal and you have something like two layers of velvet rubbing together. So it is not the internal friction of a fluid, but more like the relative movement of two layers of plastic solids. Some very interesting discoveries have been made on that subject in relation to the molecular structure of the lubricant and it is one of the active problems in lubrication research today.

The Bureau of Mines has a petroleum section at Bartlesville, Oklahoma, which is concerned with problems of lubricating oil production. But the Bureau of Mines is not officially engaged in this subject that I have just discussed, namely, basic research on the action of the lubricating film. The Bureau of Standards, however, is working on that subject, and has a laboratory at Washington devoted to it. There is also a special Research Committee on Lubrication in the American Society of Mechanical Engineers. It would no doubt be mutually helpful if any members of the Railway Club who are interested would get in touch with this Committee, by addressing the Secretary of the A. S. M. E., 29 West Thirty-ninth Street, New York City, and putting your questions up to that Committee to see what information they can supply, and to assist that Committee in outlining its work so as to cover the requirements of the railway industry.

In all your studies to reduce power losses in railway operation do not forget the power loss that occurs in one very obscure place that hasn't anything to do with lubrication, that is, between the wheel and the top of the rail. We came up

against that question of rolling friction in the Bureau of Mines tests on friction losses in mine cars, and found that you could have mine cars fitted with different bearings, but unless they had exactly the same wheels, they might differ in friction more on account of the way the wheels were made, than they did on account of the bearings supplied. You must have that problem in railroad work. If any one here knows of any experiments on the actual measurement of rolling losses (exclusive of bearing friction) I should be glad to learn about them. We could not find any such experiments on wheels since about 1844, when tests were made on wagon wheels by the French government. We have therefore undertaken what appear to be the first and only experiments on rolling friction of car wheels. This was found necessary in order to reduce the mine car results to a fair basis for comparison. Do not overlook that factor, as it appears to be no less important than the bearing losses.

Coming back to that matter of the 50,000 lbs. per sq. inch or more which represents the pressure in the oil film near the high spots in a bearing when rubbing takes place, we may ask, what is the viscosity of an oil when it is under that pressure? Experiments were made to determine the actual viscosities of different oils while being squeezed under such pressures. Curves were obtained showing that, at constant temperature, all oils get very much more viscous under high pressure. Some kinds of oil may become as viscous as grease, while other kinds remain fluid.

The foregoing remarks are intended simply to indicate what some of us are trying to find out by means of lubrication research. The best way for such research work to progress is for the industry, that knows what the problems are, to get in touch with research laboratories that are able to solve them; this can be done through the national engineering societies.

VICE PRESIDENT: Does any member desire to ask any questions?

MR. H. B. KELLY: I would like to ask the speaker what his experience has been with lubricating oil in regard to a high degree of superheat, at what point does the oil flash?

MR. HERSEY: There is, of course, a variety of flash points in oils and they run all the way from, say, 300° to 500°

F, or higher. You might like to get this paper by Duguid and look it over.

MR. KELLY: Is he connected with the Galena Signal Oil Co.? I know him very well.

MR. HERSEY: Engineer of Tests, Galena Signal Oil Co.

MR. KELLY: Take a locomotive where you have 675° to 700° superheat and are trying to lubricate the locomotive—

MR. HERSEY: What kind of oil and how is it used?

MR. KELLY: Feeding oil from hydrostatic lubricator down to the cylinder with steam pipe, with your experience at what degree will the oil flash?

MR. HERSEY: My experience does not exactly cover that. It is quite likely that somebody here can answer that.

MR. KELLY: We had trouble on our railroad and we figured that before the oil passed from the valve down into the cylinder the viscosity was burned out of the oil, and that was the reason we did not get any lubrication in the cylinder, and we had to go to direct cylinder feed.

MR. HERSEY: Off hand, I should think that is what you might have to do.

MR. KELLY: Some people claim that the best grade of oil you can get will flash at 625°, some 675°, some 700°, and I wanted to know what your experience was, what is the highest point you know of where the oil would flash?

MR. HERSEY: Speaking personally, I have not come in contact with any oils that will flash as high as those temperatures. I do not doubt there are such oils.

VICE PRESIDENT: What Mr. Kelly is speaking about is that this oil is in suspension in the steam, and he is trying to draw out whether or not the lubricating qualities of that oil will be burned out before the surfaces will be lubricated.

MR. HERSEY: Is there any air in that steam?

VICE PRESIDENT: Oh, yes.

MR. HERSEY: The man who could answer that would be Mr. W. H. Herschel, of the Bureau of Standards. If you will address a letter to the Director of the Bureau of Standards and ask that question, it would be in their regular routine to give you an answer.

MR. KELLY: In my experience in lubricating locomotives I feel that you lose the lubricating values at about 625°. The oil companies will never agree with me in that.

VICE PRESIDENT: If I understand your statement, as far as you know there is no lubricant made that will not burn up before it reaches 750° temperature.

MR. HERSEY: None that I know of that will not lose its lubricating value to some extent; but that is merely a statement of the limits of my knowledge, and not strictly a statement concerning oil.

MR. SAMUEL LYNN: I have had some little experience trying to keep the journal boxes on railroad cars from running hot, as the heating of a journal invariably requires the renewal of wheels and journal bearings. We have used different grades of oil in journal boxes and I can recall when I first started on the position where I was responsible for the care of journal boxes on equipment moving over the railroad—we were having quite a number of hot boxes and in order to reduce the percentage, the dope in the journal boxes was flooded with oil, the theory being that if there was plenty of oil in the boxes the journals or bearings would not run hot. Notwithstanding the fact that there was more oil in the boxes than they would contain, we still had hot boxes.

For a number of years the road with which I am connected, has been using Galena oil for journal box lubrication. This is considered a high grade oil and we have not yet been able to eliminate the hot box. There are a number of things that are responsible for hot boxes and the fact that we have hot boxes, we cannot charge it up to the lack or grade of oil used, in fact, I sometimes question whether any particular grade of oil can be selected and guaranteed as a proper lubricant for journal lubrication under freight cars. In my experience I have found that if there is sufficient oil in the box and sufficient capillary attraction to get the oil feeding through the waste to the journal in the first ten to fifteen miles of the movement of a car out of a terminal there will be very little trouble with the journals on that car. However, due to either weather conditions or other causes when cars start out of a terminal the journals start to heat before there is a sufficient flow of oil through the waste to the journal and bearing, and as a result the journals will heat up and after they have once started to heat, the application of additional waste or oil to that particular journal will have little or no affect in keeping the journal from heating to the point where the car has to

be set out. Therefore, what I am particularly interested in is to learn how we can get a lubricant that is going to lubricate or feed through the packing in the box as soon as the car starts out of the terminal.

MR. HERSEY: I agree with you. The business of getting the oil into the bearing may be many times more important than the kind of oil you put there. I believe there are differences in oils in regard to capillary power, however. I believe tests have been made that show that some grades of oil will climb up a piece of waste faster than another, but I doubt if the difference is very great. If there is, those that have the greater surface tension would seem to be the most promising.

MR. F. H. STARK: The subject of lubrication is an important one. It represents safety, energy, time and money. Most of us have had some experience with loads carried on some sort of rotary bearings. Take for instance freight car lubrication. It is an open question as to just where the oil, through age and service, loses its value as a lubricant. Much, of course, depends on the operating conditions. Likewise, automobile lubrication, the conditions are vastly different but should the old oil be entirely discarded after five hundred miles or can new oil be added and produce practical results?

MR. HERSEY: There is a system for putting in a mixture of oil that is just a little too viscous when first put in, so that when it gets up to the maximum gasoline dilution it will ever take, it will be just right for running, and now if you can keep the dirt out, you have got a pretty nearly ideal solution. Then there is another system in which the oil is reconditioned and circulated back. As to the mileage—a while ago, people were not so careful about choking the gas when starting up on a cold morning and that is one cause of trouble, more than anything else. The conditions of operation as well as the kind of oil used determine the mileage possible before draining the crank case. I do not suppose, without some of these patented devices, or very favorable conditions of operation, there is anything better than changing the oil probably every 500 miles, to be on the safe side.

MR. H. W. KELLEY: Will the speaker tell us a little more about surface tension and capillarity.

MR. HERSEY: Capillarity is a general term, and surface tension is a specific term, meaning about the same thing.

Surface tension might be defined as the force with which the film of liquid resists being broken; or it is equivalent to saying that it is the force of tension per unit length on any line you may draw in the surface of the liquid. That is the force that tends to make a liquid climb up a capillary tube or a wick.

MR. S. G. DOWN: Have your experiments indicated the relative values of asphalt base oil as compared with paraffin base oil?

MR. HERSEY: No, I can not give anything on this from personal experience. You could get either of those oils that would give the same frictional resistance, but it is possible that one of them would leave more residual deposit and require to be cleaned out oftener than the other.

VICE PRESIDENT: Are there any further questions? If not, we will listen to the report of the Nominating Committee.

MR. E. C. SATTLEY, Chairman, read the report of the Nominating Committee, as follows:

President

George W. Wildin, Asst. Vice President, Westinghouse
Air Brake Company.

First Vice President

E. J. Devans, General Superintendent, B. R. & P. Ry.

Second Vice President

F. W. Hankins, Genl. Supt. Motive Power, Pennsylvania Rail-
road System.

Secretary

J. D. Conway.

Treasurer

F. H. Stark.

Executive Committee

(7 to elect) L. H. Turner, Frank J. Lanahan, D. J. Redding,
A. Stucki, Samuel Lynn, D. F. Crawford, F. G. Minnick.

Membership Committee

(To serve 3 years) J. E. Hughes, J. L. Cunningham,
C. M. White, H. G. Huber, A. F. Coulter.

Entertainment Committee

(To serve 3 years) Norman Allderdice.

Reception Committee

(To serve 3 years) A. B. Severn, L. V. Stevens.

Subject Committee

(To serve 3 years) Prof. Louis E. Endsley, J. A. Ralston.

Finance Committee

(To serve 3 years) J. F. McGann, J. B. Wright.

We have made no reference to such committee members elected at the annual meeting October, 1925, whose terms of office have not expired.

VICE PRESIDENT: The ballots for election of officers will be sent out in the usual course, and on those ballots will be blank spaces in which you can vote for any person you desire other than the candidates submitted by the Nominating Committee. You will understand that you are to have a free hand to vote for any person you may desire for any office in the Club.

MR. H. B. KELLY: I would like to move a rising vote of thanks to Mr. Hersey for his most interesting paper.

The motion prevailed by unanimous rising vote.

There being no further business, upon motion, adjourned.

J. D. CONWAY, Secretary.

In Memoriam

E. L. CHOLLMAN,
Died December, 1925.

D. M. HOWE,
Died June 2, 1926.

J. H. ROSENSTOCK,
Died June 8, 1926.

GRAFTON GREENOUGH,
Died July 8, 1926.

Society of Railway Secretaries

Abstract of Minutes of Meeting Held at Atlantic City June 10, 1926

The Society of Railway Club Secretaries met at the Hotel Marlborough-Blenheim, Atlantic City, N. J., June 10, 1926, with the following members and representatives in attendance:

New York Railroad Club: Harry D. Vought, Secretary.

Central Railway Club: Harry D. Vought, Secretary-Treasurer.

Western Railway Club: Bruce V. Crandall, Secretary.

Canadian Railway Club: C. R. Crook, Secretary.

Mr. Crandall as Chairman presided.

Mr. John D. Conway, Secretary of the Railway Club of Pittsburgh was unavoidably detained in connection with his official duties as Secretary of the Railway Supply Manufacturers' Association.

Letters of regret were received from:

New York Railroad Club: W. F. Jones, President.

Central Railway Club: A. E. Calkins, President.

Cincinnati Railway Club: D. R. Boyd, Secretary.

Southern and Southwestern Railway Club: A. T. Miller, Secretary.

Cleveland Steam Railroad Club: F. L. Frericks, Secretary-Treasurer.

Pacific Railway Club: W. S. Wollner, Secretary.

The minutes of the last meeting held in June, 1924, at Atlantic City, were read and approved, as was also the report of the Secretary-Treasurer showing that it will be necessary to ask the various clubs to pay an assessment of \$15.00 for 1926-1927, the probability being that if the Society of Technical Secretaries makes a refund of the last payment made for dues of members of the Society of Railway Club Secretaries, the latter will have enough money to carry on its work for several years, this being contingent, of course, on no extraordinary expense being incurred.

The Secretary further reported that since the last meeting A. J. Merrill has resigned the Secretaryship of the Southern & Southwestern Railway Club and had been succeeded by A. T. Miller, of Atlanta, Ga.

Also, correspondence had been exchanged with F. L. Frericks, Secretary-Treasurer of the Cleveland Steam Railroad Club indicating that this new organization would probably affiliate with the Railway Club Secretaries.

A further effort had been made to enlist the membership of the Cincinnati Railway Club and the Pacific Railway Club of San Francisco and which it was hoped might be successful later on.

The report was approved.

Discussion was had on ways and means for increasing the practical usefulness of the clubs represented in the Society.

As usual there was an extended interchange of experiences and practices which, it was anticipated, would be brought to the attention of the Executive Committee of each club for further consideration and action.

The Secretary reported the death of Mr. Daniel M. Brady, who founded the Society and through whose stimulus, enthusiasm and interest the Society had on many occasions been largely benefited. His loss was likely to be keenly felt because he was always ready to attend meetings of the Society at which he presented valuable suggestions that invariably resulted in fresh zest and ambitious undertaking.

Chairman Crandall took occasion to personally emphasize these sentiments, saying Mr. Brady's co-operation which had been so freely given, would be always missed in future meetings and work of the Society.

Resolutions paying appropriate tribute to Mr. Brady's worth, his intense interest in the responsibilities of the Society and what he did personally for the Society in many ways, were adopted.

One of the gratifying features developed was the prospective enlarge-

ment of the membership of the Society in its particular field of operation which promised to be of added benefit to the various railway clubs.

The following officers were elected:

Chairman: Mr. C. R. Crook.

Vice-Chairman: Mr. A. T. Miller.

Secretary-Treasurer: Mr. Harry D. Vought.

The Round Table Luncheon which followed the business meeting was in many ways the most satisfactory ever held.

Nearly every club was represented by its Secretary or some other officer and there was a prolonged interchange of suggestions and ideas calculated to lay a foundation for departures hereafter that are expected to promote not only an increased membership but greater welfare, especially in creating interest in club meetings and larger attendance of members.

It was urged by the officers of several clubs that something definite should be agreed upon which would put the officers and members of the railway clubs in a substantial way behind the secretaries and give them that undivided support which would not only encourage them in their efforts to give efficient service for maintaining club interest, but increase their material usefulness to their various organizations.

It was therefore agreed to hold a meeting in New York during the early part of December, 1926, that is expected to be of unusual importance to every Association Secretary in the country and the Railway Clubs in particular in connection with a plan for a larger and co-operative organization expected to promote not only increased membership but greater welfare of all concerned.

Respectfully submitted,

HARRY D. VOUGHT,

Secretary-Treasurer.

INDEX OF PAPERS AND THEIR AUTHORS

PRESENTED BEFORE RAILWAY CLUBS DURING THE SEASON OF 1925-1926

COMPILED BY THE SOCIETY OF RAILWAY CLUB SECRETARIES

NEW YORK RAILROAD CLUB

Harry D. Vought, Room 314, 26 Cortlandt St., New York City
Secretary

- September 18, 1925—"Personnel Departments and the Railroads. By Edwin F. Daley, Assistant to S. M. P. & E. and Director Personnel, D. L. & W. R. R.
- October 16, 1925—Younger Men's Night. Addresses by Roy V. Wright, Chairman, Subjects Committee, N. Y. R. R. Club; Charles E. Alexander, Pennsylvania System, Philadelphia; Leo Downs, Machinist Apprentice, Lehigh Valley R. R., Waverly, N. Y.; Strother Keiser, C. & O. Ry., Russell, Ky.; John MacMurray, Senior, Engineering Department, Princeton University; Harry E. Norton, Division Accountant, N. Y. N. H. & H. R. R.
- November 20, 1925—"Electrification of Staten Island Lines of the B. & O. System." By J. H. Davis, Chief Engineer, Electric Traction, B & O. R. R., Baltimore; Election of Officers and Annual Reports of the Secretary and the Treasurer.
- December 17, 1925—Seventh Annual Dinner of the Club at Hotel Commodore with President W. F. Jones as Toastmaster and addresses by Dr. Charles Alexander Richmond, President, Union College, Schenectady, N. Y., and "Senator" Ford

with miscellaneous entertainment arranged by David W. Pye, Chairman, Dinner Committee, James S. Doyle, Director of Entertainment.

- January 15, 1926—"The Transportation Act of 1920; its Workings and Proposed Amendments." By F. J. Lisman, New York. Concert by the Reading Seashore Band, John L. Snyder, Director.
- February 19, 1925—"How Can Our Club Better Serve its Members and the Railroads?" Open discussion by Roy V. Wright, Chairman, Subjects Committee; F. T. Dickerson, Past President and Secretary and Treasurer of the Central Railroad of New Jersey and the Reading Co.; Franklin Snow, Transportation Editor, Christian Science Monitor; John Draney, Locomotive Engineer, Lackawanna Railroad; F. W. Brazier, Assistant to the Superintendent of Rolling Stock, N. Y. C. R. R.; W. G. Gove, Superintendent of Equipment, Brooklyn-Manhattan Lines; W. M. Van Thoff, Purchasing Dept., N. Y. C. R. R.; William S. Baker, Special Assistant to Vice President in charge of Personnel, N. Y. C. R. R.; J. C. Clark, Industrial Counsellors, Inc.; George Wagstaff, American Arch Co.; Col. Charles Hine; L. R. Gurley, Associate Editor, Railway Mechanical Engineer.
- March 19, 1926—"Stabilizing by Budget." By C. D. Young, Stores Manager, Pennsylvania R. R., with introductory addresses by President W. F. Jones, G. S. K., N. Y. C. R. R. and W. G. Besler, President, C. R. R. of N. J. and formal discussion by F. S. Austin, G. S. K., B. & A. Ry.; Edward Wray of Chicago, Editor of Purchases and Stores; Col. Charles Hine and W. E. Symons.
- April 16, 1926—Second Electrical Night with illustrated paper by H. L. Andrews, Assistant Engineer, Railway Dept., General Electric Co., on "Motor Bus Transportation." Discussion by R. H. Horton, President, Rural Transit Co., Philadelphia; Ernest Murphy, United Trancion Co., Albany, N. Y.; C. K. Lee, Westinghouse E. & M. Co.; Paul Weeks, American Car & Foundry Co.; C. Froesch, International Motors Co., and H. A. Winkelmann, Technical Superintendent, Tire Division, B. F. Goodrich Co.
- May 21, 1926—"The Railroad Department of Public Relations." By Charles Frederick Carter. Discussion by W. E. Symons; the Secretary of the Club; Past President F. T. Dickerson; President W. F. Jones; Roy V. Wright, Chairman, Subjects Committee; F. W. Brazier, Assistant to Superintendent of Rolling Stock, N. Y. C. R. R. and George Flatow, New York Representative, Pennsylvania Railroad Publication Bureau. Also concert and entertainment by Long Island Railroad Employees' Sunshine Trail Band, under the direction of H. Edward Zitmann.

CENTRAL RAILWAY CLUB

Harry D. Vought, 26 Cortlandt St., New York City
Secretary-Treasurer

- September, 1925—"Lima 2-8-4 Locomotives." By H. W. Snyder, Mechanical Engineer, Lima Locomotive Works.
- October 8, 1925—Ladies' Night. Choral and solos by the Pennsylvania Glee Club.
- November 12, 1925—"Through Freight Service." By D. W. Dinan, Assistant General Manager, N. Y. C. R. R. Discussion, R. E. Woodruff, Supt., Erie R. R., Buffalo; A. R. Ayers, Cleveland,

Assistant G. M., Nickel Plate R. R.; Robert Faries, Supt., Pennsylvania R. R., Buffalo; W. O. Thomson, Supt., Rolling Stock, N. Y. C. R. R. and E. F. Ryan, Terminal Supt., B. R. & P. R. R., Buffalo.

- December 3, 1925—"Friendly Relations Between the Public and the Railroads." By *Homer E. Burber, Plant Manager, National Aniline Co.* Discussion, *G. C. Woodruff, Assistant Traffic Manager, N. Y. C. R. R.; R. E. Woodruff, Supt., Erie R. R., Buffalo; F. S. Renshaw, Traffic Manager, Buffalo Chamber of Commerce; Frank M. Barker, Supt. L. V. R. R., Buffalo; Daniel C. Daley, Supervising Agent, Pennsylvania R. R. and A. E. Staub, Assistant to V. P. & G. M., Lackawanna R. R.*
- January 14, 1926—Annual Meeting and Election of Officers and Annual Dinner with *Charles C. Pierce of the General Electric Co. of Boston as Toastmaster and addresses by President J. M. Davis of the Lackawanna R. R.; E. T. Whiter of Pittsburgh, Vice President of the Pennsylvania R. R., and the Rev. Henry M. Mooney of Corfu, N. Y.*
- February 11, 1926—Younger Men's Night. Address by *A. H. Whitford, Buffalo, General Secretary, Y. M. C. A.; papers by J. M. Grestzen, Assistant Chief Interchange Inspector, Buffalo, on Car Inspection; John J. Jones, Assistant Agent of the Nickel Plate R. R., on Station Accounting; E. F. Hood, Assistant Signal Supervisor of the N. Y. C. R. R., on Signal Maintenance; Rough Road of Experience, by Tallman Ladd, Assistant E. H. F., Pennsylvania R. R., Oil City, Pa., "Divisional Car Distribution," by John Ortner, Car Distributor, Erie R. R., Buffalo, and "First Aid and Safety First," by Raymond Mitchell, Freight Conductor, L. V. R. R., Buffalo.*
- April 8, 1926—"Development of Transportation in and about Buffalo." By *Elmer J. Beach, presented by E. M. Renshaw, Traffic Commissioner, Buffalo Chamber of Commerce. Discussion by W. C. Kendall, Manager, Railroad Relations Section, A. R. A.; Frank M. Barker, Supt., L. V. R. R., Buffalo; E. J. Parrish, Supt., Nickel Plate R. R., Buffalo; G. G. Randall, Boston, District Manager, Car Service, A. R. A.; A. P. Stevens, District Manager, Car Service, A. R. A., Detroit; R. E. Woodruff, Supt., Erie R. R., Buffalo, and Frank E. Miiten, Trainmaster, L. V. R. R., Buffalo.*
- May 13, 1926—Ladies' Night. Instrumental and Vocal Program and other entertainment.

WESTERN RAILWAY CLUB

Bruce V. Crandall, 189 W. Madison St., Chicago, Ill.
Secretary

- September, 1925—Addresses by *Mrs. Nellie M. Severance and Miss Alice R. Kellar, Railway Business Women's Association of the Twin Cities.*
- October, 1925—"Supplies, Purchase, Distribution and Use." By *Frank B. Reed, Vice President and Gen. Purchasing Agent, C. R. I. & P. Ry.; J. R. Stuart, Gen. S. K., C. B. & Q. R. R.; A. G. Trumbull, Chief Mech'l Engr., Erie R. R.*
- November, 1925—"Simplified Railroading." By *T. C. Powell, President C. & E. I. R. R.*
- December, 1925—"What is the Most Efficient Way to Operate Local Freight Trains and What Advantages and Economies are to

be Gained by Grouping Trains for Through Movements?" By *F. W. Rosser, Supt. of Trans., Erie R. R.*

January, 1926—"Lubrication of Freight and Passenger Cars." By *G. E. Dailey, Supervisor Lubrication, C. B. & Q. R. R.*

February, 1926—"Development of Motive Power for Transportation Purposes in Europe." By *W. H. Finley, Consulting Engineer.*

March, 1926—"Electromotives, Locomotive and Motor Cars." By *W. B. Potter, Chief Engineer, Railway Dept., General Electric Co.*

April, 1926—"Freight Claim Division A. R. A." By *J. W. Dietrich, J. D. Shields and Dr. W. J. Embree.*

May, 1926—Annual Meeting and Dinner. *W. F. Thiehoff, Toastmaster; addresses by R. H. Aishton, Robert C. Ross, H. T. Bentley.*

NEW ENGLAND RAILROAD CLUB

Wm. E. Cade, Jr., 683 Atlantic Avenue, Boston, Mass.

Secretary

October 13, 1925—"Some Observations on the Railroad Situation." By *J. H. Hustis, President, Boston & Maine R. R.*

November 10, 1925—"The American Railway Engineering Association." By *J. E. Armstrong, Assistant Engineer, Canadian Pacific Ry. Co.*

December 8, 1925—"Ultimate Economies—Transportation Service." By *L. K. Sillcox, General S. M. P., C. M. & St. P. Ry.*

January 12, 1926—"Gross Ton Miles Per Train Hour as a Unit of Operating Efficiency." By *Professor William J. Cunningham, Harvard University.*

February 9, 1926—"The International Railway Congress of 1925." By *Julius H. Parmelee, Director of Bureau of Railway Economics, Washington, D. C.*

March 9, 1926—Forty-third Annual Meeting; election of officers and reports; also moving picture showing the development of car construction by *George A. Richardson, Manager of the Technical Publicity Department of the Bethlehem Steel Co.*

April 13, 1926—"Designing Locomotives to Reduce Rail Stresses." By *H. H. Lanning, M. E., The A. T. & St. Fe Ry. Co.*

May 11, 1926—Annual banquet entertainment.

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B. W. Frauenthal, Drawer 24, M. & P. O., St. Louis, Mo.

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September, 1925—"Providing a Railroad's Water Supply." By *R. C. Bardwell, Superintendent Water Supply, Chesapeake & Ohio Ry., Richmond, Va.*

October, 1925—"Transportation by Water." By *T. C. Powell, President, C. & E. I. R. R., Chicago, Ill.*

November, 1925—"Courtesy—Service—Satisfaction." By *A. C. McKibbin, Director of Public Relations of the St. Louis-Southwestern Lines.*

December, 1925—"The National Transportation Act." By *James C. Davis, Director General of Railroads, Washington, D. C.* "Economics of Railway Labor." By *C. C. Cook, Maintenance Engineer, Baltimore & Ohio R. R., Baltimore, Md.*

- January, 1926—"Relation Between Rail and Water Transportation." By *Carl J. Baer, President, Standard Unit Navigation Co., St. Louis, Mo.*
- February, 1926—"A Century of Car Manufacturing Progress." By *George A. Richardson, Manager, Technical Publications Department of the Bethlehem Steel Co., Bethlehem, Pa.*
- March, 1926—"A Tribute to My Countrymen." By the *Hon. Edward P. Morrow, United States Labor Board, Chicago, Ill.,* and "The 1926 Caribbean Cruise." By *Jerome Bauduy Corby, President, Corby Supply Co., St. Louis, Mo.*
- April, 1926—"History of Missouri, St. Louis and Railroad Building in the United States." By *George O. Brophy, Special Representative, Union Pacific System, Omaha, Neb.*
- May 14, 1926—"Progress and Possibilities in Safety." By *Thomas H. Carrow, Supt. of Safety, Pennsylvania R. R. System, Philadelphia, Pa.*

THE RAILWAY CLUB OF PITTSBURGH

John D. Conway, 515 Grandview Ave., Pittsburgh, Pa.
Secretary

- September 24, 1925—"Utilization of Freight Cars. From the Viewpoint of Loading, Design and Maintenance." By *L. K. Sillcox, Gen. S. M. P., C. M. & St. P. Ry., Chicago, Ill.*
- October 22, 1925—Annual Meeting. Election of Officers. Names of Members. Constitution and By-Laws.
- November 27, 1925—"Looking Ahead." A Better Type of Leadership and More Carefully Trained Workers Must Be Provided. By *Roy V. Wright, Managing Editor, Railway Age, New York.*
- December, 1925—"Rail Motor Cars." By *C. E. Brooks, Chief of Motive Power, Canadian National Railways, Montreal, Que.*
- January, 1926—"Pittsburgh Forward Movement." By *Charles E. Watkins, Past District Governor, Rotary International, Detroit, Mich.*
- February, 25, 1926—"Man Failures—Cause and Remedy." By *R. E. Hoodruff, Supt., Erie R. R., Buffalo, N. Y.*
- March 25, 1926—"Train Operation by Signal Indication." By *H. M. Sperry, Consulting Signal Eng., New York, N. Y.*
- April 25, 1926—"A Square Deal on Valuation and Earnings." By *Robert S. Binkerd, Vice-Chairman, Committee on Public Relations of the Eastern Railroads.*
- May 27, 1926—"A Century of Car Manufacturing Progress." By *George A. Richardson, Mgr., Technical Publicity Dept., Bethlehem Steel Co., Bethlehem, Pa.*

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB

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- September 17, 1925—"Inspection of Locomotive Water Space Flexible Stay Bolts." By *E. S. Fitzsimmons, Flannery Bolt Co., Pittsburgh*
- November 20, 1925—"Heat Treating of Steel." By *W. W. Shackford, Foreman Blacksmith, Atlantic Coast Line, Waycross, Ga.*

- January 15, 1926—"Oxygen—The Wonder Worker." By *H. L. Rogers*, *Railroad Engineering Department, Air Reduction Sales Co., New York.*
- March 19, 1926—"Application and Maintenance of Motors and Control in Railroad Shops." By *Charles F. King, Jr., General Engineer, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.*
- May 21, 1926—"A Century of Car Manufacturing Progress." By *George A. Richardson, Bethlehem Steel Co.*
- July 15, 1926—"The Advantages of Organization and the Maintenance of Motive Power." By *A. G. Pack, Chief Inspector, Bureau of Locomotive Inspection, I. C. C., Washington.*

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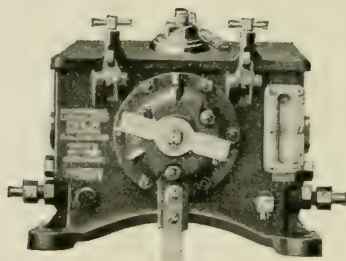
- September 8, 1925—"How the Railroads Can Use Radio." By *G. Y. Allen, Asst. to Manager, Radio Dept., Westinghouse E. & M. Co.*
- October, 13, 1925—"Steel—The Giant Industry." By *George Richardson, Bethlehem Steel Corp.*
- November 10, 1925—"Shop Costs and Output." By *J. W. Kennedy, General Supervisor, Production Dept., Canadian Pacific Ry., Montreal.*
- December 8, 1925—"Inspection and Testing of Railway Materials." By *R. Job, Vice-President, Milton Hersey Co., Ltd., Montreal.*
- January 12, 1926—"Air Transportation." By *Lt. Col. Scott Williams, Manager Tractor Dept., Mussels, Ltd., Montreal.*
- February 9, 1926—"The Influence of the Motor Vehicle Upon Transportation." By *R. A. C. Henry, Director, Bureau of Economics, Canadian National Railways, Montreal.*
- March 9, 1926—"The Oil-Electric Locomotive in Railroad Service." By *L. G. Coleman, Manager, Locomotive Dept., Ingersoll-Rand Co., New York.*
- April 13, 1926—"Freight Claims; Their Cause and Prevention." By *C. M. MacDonald, Freight Claim Agent, Boston & Maine R. R., Boston.*

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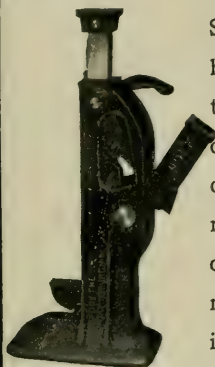
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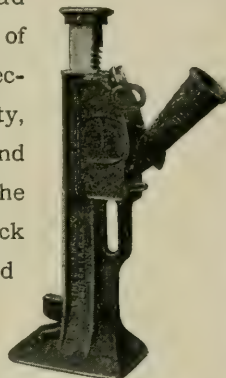


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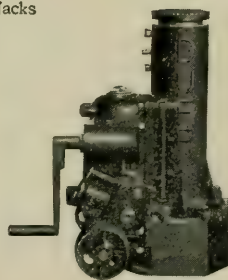
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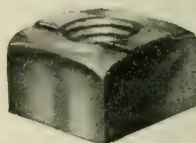
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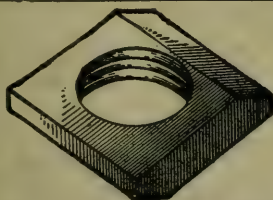
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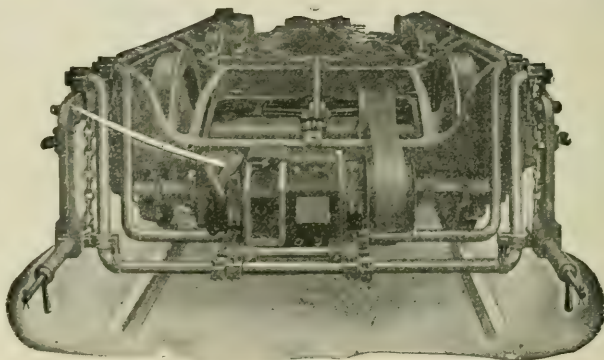
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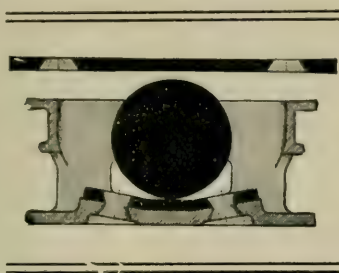
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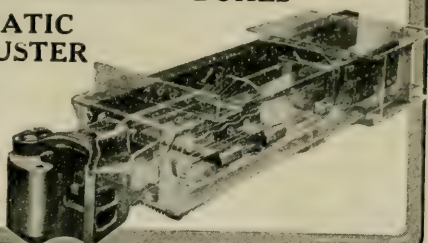
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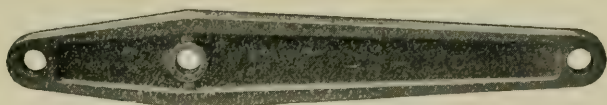
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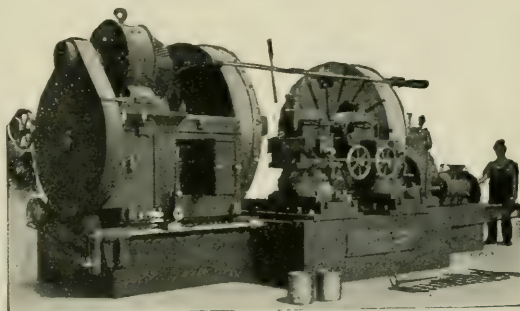
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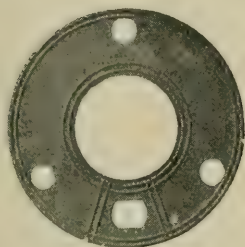
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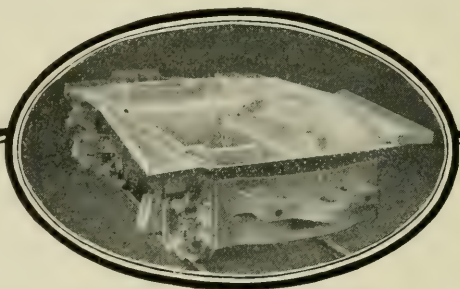
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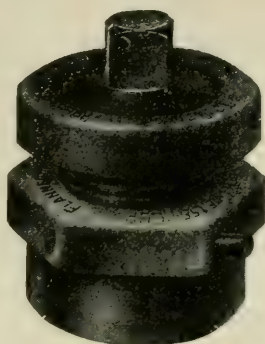
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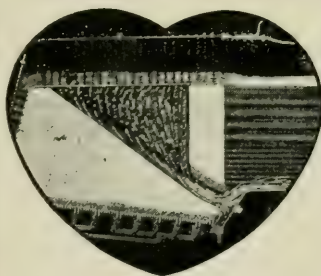
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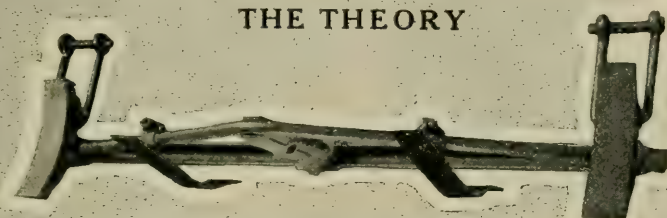
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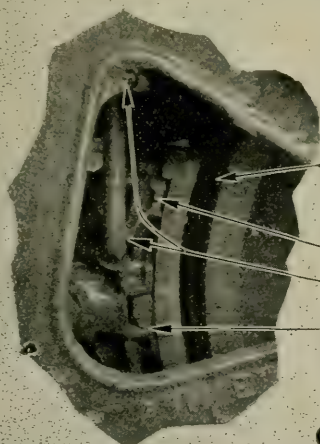




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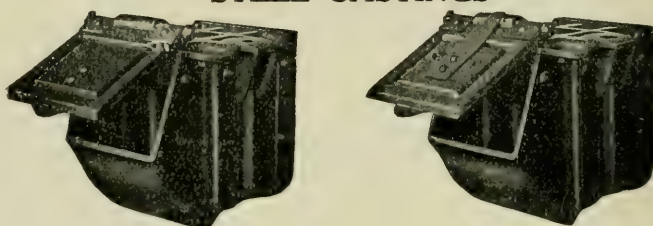


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Pittsburgh, Pa., October 28, 1926

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A. STUCKI	November, 1924, to October, 1925

*—Deceased.

Meetings held fourth Thursday of each month except June, July and August.

PROCEEDINGS OF ANNUAL MEETING

OCTOBER 28, 1926

The meeting was called to order at the Fort Pitt Hotel, Pittsburgh, Pa., at 8:00 o'clock P. M., President F. G. Minnick in the chair.

The following gentlemen registered:

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 Snyder, Joseph, Jr.
 Southworte, E. T.
 Statler, H. A.
 Stanek, Joseph L.
 Stark, Joseph A.
 Starr, A. D.
 Stewart, L. R.
 Strehlan, Edward H.
 Strickler, F. M.
 Strommen, T. A.
 Sundholm, F. J.
 Suterma, A. L.
 Thomas, H. N.
 Tobin, F. L.
 Tracy, Thomas M.
 Tracy, T. W.
 Vogel, E. E.
 Vollmer, J.
 Wagner, J. M., Jr.
 Ward, John
 West, William J.
 White, A. C.
 Williams, A. G.
 Willson, O. S.
 Wilson, Joseph A.
 Wolfe, Ralph
 Wycisk, P.

The call of the Roll was dispensed with, the record of attendance being obtained through the registration cards.

The reading of the minutes of the last meeting was dispensed with, as they are to appear in printed form.

The Secretary read the following list of applications for membership:

Bayer, George J., Superintendent, Wheel Finishing Department, Forged Steel Wheel Company, 112 Cross Street, Butler, Pa. Recommended by J. G. Christfield.

Bull, R. S., Superintendent of Equipment, Pittsburgh Railways Company, 435 Sixth Avenue, Pittsburgh, Pa. Recommended by A. Stucki.

Cashmore, G. A., Captain of Police, P. & L. E. R. R., 250 Southern Avenue, Pittsburgh, Pa. Recommended by R. Toussaint.

- Chaney, James A., Secretary, P. & L. E.-Y. M. C. A., Dickerson Run, Pa. Recommended by J. E. Hughes.
- Cooper, F. E., Shop Superintendent, B. & O. R. R., Glenwood, Pittsburgh, Pa. Recommended by E. A. Johnson.
- Copeland, Thomas T., Carnegie Steel Company, Munhall, Pa. Recommended by J. D. Conway.
- Davin, W. E., Assistant Roadmaster, P. & L. E. R. R., 340 Russellwood Avenue, McKees Rocks, Pa.
- En Dine, J. F., Inspecting Engineer, P. & L. E. R. R., 436 Edgemont Street, Knoxville, Pittsburgh, Pa. Recommended by J. E. Hughes.
- Follert, W. F., Assistant to Superintendent, Aliquippa & Southern Railroad, 106 King Street, Woodlawn, Pa. Recommended by C. D. O'Connor.
- Geikler, J. Alfred, Sales Engineer, Westinghouse Electric & Manufacturing Company, 1318 Singer Place, Wilkinsburg, Pa. Recommended by A. P. Schrader.
- Goldstrom, Walter, Captain of Police, P. & L. E. R. R., Terminal Annex Building, Pittsburgh, Pa. Recommended by R. Toussaint.
- Grossheim, Elmer C., Storekeeper, Aliquippa & Southern Railroad, 1302 Main Street, Woodlawn, Pa. Recommended by C. D. O'Connor.
- Harriott, Edward, Lieutenant of Police, P. & L. E. R. R., 683 Seventh Avenue, West Homestead, Pa. Recommended by R. Toussaint.
- Herr, R. D., Interior Lighting Engineer, Westinghouse Electric & Manufacturing Company, Chamber of Commerce Building, Pittsburgh, Pa. Recommended by A. P. Schrader.
- Honsberger, G. W., Salesman, Westinghouse Electric & Manufacturing Company, Chamber of Commerce Building, Pittsburgh, Pa. Recommended by A. P. Schrader.
- Kelley, H. W., Locomotive Inspector, Pennsylvania Railroad Co., 5840 Center Avenue, Pittsburgh, Pa. Recommended by J. D. Conway.
- Kight, R., Assistant Trainmaster, Western Maryland Railway Co., Cumberland, Md. Recommended by Charles Thomas.

- Leiper, C. I., General Manager, Central Region, Pennsylvania Railroad, Pennsylvania Station, Pittsburgh, Pa. Recommended by J. H. Redding.
- Moody, M. R., Mfg. Engineer, Westinghouse Electric & Manufacturing Company, 1031 Macon Street, Pittsburgh, Pa. Recommended by A. P. Schrader.
- Muse, Thomas Charles, Traveling Car Agent, P. & L. E. R. R., 253 Fourth Street, Beaver, Pa. Recommended by J. E. Hughes.
- McCartney, John H., District Manager, James B. Sipe & Company, 165 Broadway, New York, N. Y. Recommended by J. D. Conway.
- Nieman, Charles J., Secretary-Treasurer, Penn Iron & Steel Company, Creighton, Pa. Recommended by J. D. Conway.
- Pack, N. E., Foreman Axle Shop, Pressed Steel Car Company, 1447 Steuben Street, Crafton, Pittsburgh, Pa.
- Riley, Harry T., Lieutenant of Police, P. & L. E. R. R., P. O. Box No. 36, Dawson, Pa. Recommended by R. Toussaint.
- Robison, Harry, Mechanical Expert, Locomotive Stoker Company, 4110 Grizella Street, N. S., Pittsburgh, Pa. Recommended by Francis Hogg.
- Shelton, F. M., Representative, Galena-Signal Oil Company, 1820 Mulberry Street, Scranton, Pa. Recommended by A. F. Coulter.
- Smith, E. E., General Manager, Scott Haven Coal Company, 935 Ramsey Street, Wilksburg, Pa. Recommended by J. E. Hughes.
- Starr, C. T., Assistant to President, Pittsburgh Terminal Coal Corporation, Wabash Building, Pittsburgh, Pa. Recommended by J. S. Lanahan.
- Steele, I. H., Chief Clerk to F. C. Agent, P. & L. E. R. R., 156 Ulysses Street, Mt. Washington, Pittsburgh, Pa. Recommended by J. D. Conway.
- Stevanus, Ralph, Engineer, Western Maryland Railroad, 1317 Ella Avenue, Cumberland, Md. Recommended by Charles Thomas.
- Taggart, Ross E., Inspecting Engineer, P. & L. E. R. R., 2733 Amman Street, South Hills Station, Pittsburgh, Pa. Recommended by W. R. Shannon.

Todd, A. H., Agent, P. & L. E. R. R., 706 Lincoln Street, Monongahela, Pa. Recommended by J. E. Hughes.

Trowbridge, F. A., Foreman Power House, P. & L. E. R. R., California, Pa. Recommended by J. W. Kempton.

Van Wormer, George M., Assistant Foreman Erection Department, Pressed Steel Car Company, 129 Clairhaven Street, Crafton Heights, Pittsburgh, Pa. Recommended by H. E. Kaup.

Williams, William W., Felt & Tarrant Manufacturing Company, Chamber of Commerce Building, Pittsburgh, Pa. Recommended by J. E. Hughes.

PRESIDENT: These applications will be referred to the Executive Committee in due course, and upon approval by them, the gentlemen will become members without further action than the payment of the current year's dues.

The Secretary read telegrams from G. A. Wildin, President-elect, and George D. Ogden, past president of the Club, conveying regrets at their inability to attend Smoker and extending good wishes for a most enjoyable evening to all.

The Secretary read a letter from the Westinghouse Electric & Manufacturing Company inviting Club members to visit their East Pittsburgh plant on the afternoon of November 16, 1926, for the purpose of inspecting the Great Northern motor generator locomotives, the first of their kind ever built commercially. By rising vote the courtesy of the invitation was acknowledged and a large number signified their intention of attending the inspection trip.

PRESIDENT: This being the annual meeting for the election of officers, the next order of business will be the report of the tellers of election. As you all know, our method of election is by a letter ballot sent to all the members of the Club. I will ask the Secretary to read the report of the election.

SECRETARY: The ballots received for the election of officers of The Railway Club of Pittsburgh for the ensuing year totaled 344. The ballot resulted in the unanimous election of the following:

PRESIDENT—G. W. Wildin.

FIRST VICE PRESIDENT—E. J. Devans.

SECOND VICE PRESIDENT—F. W. Hankins.

SECRETARY—J. D. Conway.

TREASURER—F. H. Stark.

EXECUTIVE COMMITTEE—L. H. Turner, Chairman, Frank J. Lanahan, D. J. Redding, A. Stucki, Samuel Lynn, D. F. Crawford, F. G. Minnick.

MEMBERSHIP COMMITTEE*—J. E. Hughes, Chairman, 3 years, Harry B. Kelly, 1 year, R. M. Long, 1 year, Col. James Milliken, 2 years, J. T. Campbell, 2 years, A. P. Schrader, 2 years, J. L. Cunningham, 3 years, C. M. White, 3 years, H. G. Huber, 3 years, A. F. Coulter, 3 years.

SUBJECT COMMITTEE*—Prof. Louis E. Endsley, Chairman, 3 years, J. S. Lanahan, 1 year, J. A. Ralston, 3 years.

FINANCE COMMITTEE*—C. O. Dambach, Chairman, 1 year, E. A. Johnson, 1 year, E. J. Searles, 1 year, J. F. McGann, 3 years, John B. Wright, 3 years.

ENTERTAINMENT COMMITTEE*—Henry F. Gilg, Chairman, 2 years, Joseph H. Kummer, 1 year, S. E. VanVranken, 2 years, Norman Allderdice, 3 years.

RECEPTION COMMITTEE*—E. Emery, Chairman, 1 year, J. L. Smith, 1 year, H. E. Passmore, 2 years, M. A. Smith, 2 years, Col. H. C. Nutt, 2 years, Robert Rogers, 2 years, A. B. Severn, 3 years, L. V. Stevens, 3 years.

PRESIDENT: It is customary at this time to call on at least a part of the officers elect, at least I was called upon to say something when I was made president, and it will be my pleasure to continue that pleasant custom. In the absence of our good friend, Mr. Wildin, who telegraphed me from Portland, Maine, this afternoon that he would not be able to be present, expressing his deep regret at his inability to be present, I wish to say in his behalf that not only as an executive officer of a Railway Club, but also as an executive officer of a railroad and of a manufacturing plant, he bears a most enviable reputation. I believe I can say for him, in his absence, that the interests of the Club for the ensuing year are in good hands. Mr. Wildin served as president of the Railway Club of New York

*In addition to newly elected committee members, the above list also gives names of those previously elected whose terms of office have not expired.

for a term, and during that time it was most prosperous. I have talked with him during the past month with regard to the Railway Club of Pittsburgh, and I find that his interest in the Club is very deep. He expressed to me his keen desire to see nothing but a most prosperous year for 1927, and he stated to me frankly that he would do everything in his power to that end.

We have also, according to the ballot, elected a First Vice President, Mr. E. J. Devans. Having known him for many years, I can say to you that he is a gentleman possessed of marked ability in many ways and in many directions. He is not only a most able railroad man, but he has the faculty of making almost anything to which he gives his attention thrive and prosper. I am satisfied that you will have much to look forward to from him in the coming year, and particularly when he eventually succeeds to the office of president. We would like very much to hear from Mr. Devans, but he is unfortunately also out of the city.

The return of the ballots also certifies that you have elected as Second Vice President, Mr. F. W. Hankins. I do not have the privilege of knowing Mr. Hankins personally, but I do know much of him by reputation. And I can say to you that I do not believe you have made any mistake. As a matter of fact the Railway Club of Pittsburgh makes very few mistakes. If Mr. Hankins is in the room I am sure the members of the Club would be very delighted to hear from him. Apparently he is not present.

I asked the genial Secretary of the Railway Club of Pittsburgh whether it is customary for the President to call on him every time he is re-elected Secretary. The reason I did that is that he has been elected Secretary for so long a time that I have rather lost track of the custom as applied to him. He informs me that the Secretary never says anything.

Now there is a gentleman who has been elected to a very important office on the roster of the Railway Club of Pittsburgh, and that is the man who looks after the finances. I am sure if there is anything in this world that appeals to everybody it is the question of money, particularly if one is prosperous. I am sure you will all be interested in hearing just what the condition of the Club, financially, is at the present time. I am going to ask Mr. F. H. Stark, the newly elected old treasurer, if he will be good enough to tell us.

MR. F. H. STARK: Mr. President, Members of the Railway Club and Guests.

Mr. Minnick has requested me to make some remarks regarding our finances. This matter will come up later, when Mr. Conway makes his report. Then, too, you have a fine program in store and I am sure you do not want me to take up valuable time.

I take this opportunity to congratulate you, Mr. Minnick, over the success of the club's activities during your administration. I am pleased to see this large gathering here tonight at our annual meeting. Further, I thank you for conferring the favor on me by re-electing me as Treasurer.

PRESIDENT: I had an idea I could steal some of John Conway's thunder by asking Mr. Stark, but it seems he has it pretty well locked up. So I am going to ask the Secretary to tell us about the condition of the Club, financial and otherwise, in his Annual Report.

SECRETARY'S REPORT

Pittsburgh, Pa., October 28, 1926.

To the Officers and Members of
The Railway Club of Pittsburgh.

Gentlemen:

The following is a summary of membership and financial statement for the fiscal year ended October 28, 1926:

MEMBERSHIP

Reported last year	1,120
Received into membership during the year.....	298
Reinstated	4
	—1,422
Suspended, non-payment of dues.....	112
Resigned	46
Loss of Address	9
Died	10
	— 177
	—
Present membership	1,245

Of the above membership four are honorary. They are: D. C. Buell, Samuel O. Dunn, Julian Kennedy and John A. Penton.

DECEASED MEMBERS

Name	Died
A. W. Abel.....	January 11, 1926
G. M. Basford.....	October 26, 1925
Daniel M. Brady.....	February 23, 1926
E. L. Chollman.....	December, 1925
Grafton Greenough.....	July 8, 1926
David M. Howe.....	June 2, 1926
A. W. McCaslin.....	February 19, 1926
F. R. McFeatters.....	October 25, 1925
George A. Post.....	October 31, 1925
J. H. Rosenstock.....	June 8, 1926

FINANCIAL

Receipts

In hands of Treasurer at close of last year.....	\$6,144.50
From dues	3,741.00
From advertisements	1,996.66
From sale of tickets, Smoker, October 22, 1925...	565.00
Cash collected for Dinner, October 22, 1925.....	150.00
From sale of tickets, Dance, April 7, 1926.....	668.00
From sale of Official Proceedings	49.25
From "Incidentals"—Surplus Account.....	53.50
From interest, Liberty Bonds and Bank Balance	160.74
	\$13,528.65

Disbursements

Printing Proceedings, Notices, Mailing, etc.....	2,747.16
Hall, luncheon, cigars, etc., for meetings.....	946.35
Reporting Proceedings of Meetings.....	180.00
Luncheon, entertainment, etc., Smoker, October 22, 1925	885.00
Six O'Clock Dinner, Smoker, October 22, 1925...	205.40
Messenger service and affidavits.....	19.50
Moving pictures	65.00
Premium on Bonds, Treasurer and Secretary.....	17.50
Contribution John A. Brashear Anniversary.....	100.00
Rental of Lock Box for Treasurer, Two years...	4.00
Flowers—Floral Tributes	77.00

Expenses of dance, April 7, 1926.....	1,251.40	
Salary of Secretary and Advertising Expenses.....	799.67	
		<hr/> 7,297.98

Net balance	\$ 6,230.67
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Cash is made up of \$3,230.67 and \$3,000.00 in Liberty Bonds.

J. D. CONWAY, Secretary.

Approved:

L. H. TURNER, Chairman

FRANK J. LANAHAH,	SAMUEL LYNN,
D. J. REDDING,	D. F. CRAWFORD,
A. STUCKI,	F. G. MINNICK,
Executive Committee.	

PRESIDENT: We will be pleased now to hear the Annual Report of the Treasurer, Mr. F. H. Stark:

TREASURER'S REPORT

To the Officers and Members of
The Railway Club of Pittsburgh.

Gentlemen:

I herewith submit Treasurer's Report for the year ended October 28, 1926:

ON HAND AND RECEIPTS

On Hand October 22, 1925.....	\$3,144.50
Cash received from J. D. Conway, Secretary.....	7,223.41
Interest on Liberty Bonds.....	127.50
Interest on Bank Balance	33.24
Total	<hr/> \$10,528.65

DISBURSEMENTS

Paid on Secretary's vouchers Nos. 522 to 574, inclusive	7,297.98
Balance	<hr/> \$ 3,230.67

RESOURCES

Three Liberty Bonds, \$1,000.00 each.....	\$3,000.00
Cash Balance on hand October 28, 1926.....	3,230.67
Total	\$ 6,230.67

F. H. STARK, Treasurer.

Approved:

L. H. TURNER, Chairman

FRANK J. LANAHAN,	SAMUEL LYNN,
D. J. REDDING,	D. F. CRAWFORD,
A. STUCKI,	F. G. MINNICK,

Executive Committee.

We have audited the accounts of the Secretary and Treasurer and find them correct as reported.

E. C. SATTLEY, Chairman,
E. A. JOHNSON,
E. J. SEARLES,
Members of Finance Committee,

Upon motion, the reports were accepted and directed to be inserted in the minutes of the meeting.

PRESIDENT: The business part of the Annual Meeting of the Railway Club of Pittsburgh has been brought to a close. During the past year we have had an Entertainment Committee composed of Mr. Henry F. Gilg, Mr. Kummer and Mr. VanVranken. The fact that Mr. Gilg, because of going into other business, found it necessary to absent himself from Pittsburgh during the past two months, has thrown the burden of working out the program entirely on Mr. Kummer and Mr. VanVranken. In order that one who is entirely familiar with the details of the program may direct its activities, I will at this point turn over the meeting to Mr. VanVranken, who will carry through the program which has been arranged.

COL. JAMES MILLIKEN: Before turning the meeting over to the Entertainment Committee I would like to say, Mr. Chairman and Mr. Ex-President, that a great many of us, in fact all of us, are disappointed that our newly elected President and Vice Presidents are not here. I happen to know each of them personally and I am sure that they are more disappointed at not being with us than we are at their absence.

Mr. VanVranken then took charge of the meeting and presented the following program, largely musical, of unusually high merit and to the great satisfaction and pleasure of the large audience:

“RAILROAD NIGHT”

Dinner Entertainment By The Pennsylvania Railroad "Broadway Limited" Entertainers, L. B. Sisson, Mgr.

"Song of the Vagabonds"-----	By Frinl
Mr. Gibb and Chorus.	
"Hunting Song From Robin Hood"-----	By DeKoven
Mr. Schoeller and Chorus.	
"Schubert's Serenade From Blossom Time"-----	By Schubert
Mr. Byers and Chorus.	
"That Lost Barber Shop Chord"-----	By Gerswin
Mr. Schaffer and Chorus.	

TENORS	ACCOMPANIST	BASSOS
H. P. Cramer	C. H. George	R. M. Gibb
I. D. Schaffer		F. W. Schoeller

"Oh, Susanna" -----	Quartet	"O'er the Billowing Sea" ----	
"Three For Jack" -----	Mr. Gibb	-----	Mr. Schoeller
"You Can't Drive My Dreams		"Cherie" -----	Mr. Cramer
Away" -----	Mr. Shaffer	"Close Harmony" -----	Quartet
"Uncle Moon" -----	Quartet		

L. M. Rubenstein, Violin Solo, "Theis"-----By Massenet
E. Herbert Gilg, Accompanist.

W. J. Flatley-----Monologue

F. C. Sheparson, Bass Solo, "Sleepy Hollow Tune"-----By Kountz
 "Duna" -----By McGill
 E. Herbert Gilg, Accompanist.

PITTSBURGH & LAKE ERIE RAILROAD

Frank Iannone, Cornet Solo, "The Carnival of Venice," by Herbert Clark
E. Herbert Gilg, Accompanist.

BALTIMORE & OHIO RAILROAD

"Capitol Limited" Four

TENORS

Frank Becker

Al. Sutter

BASSOS

W. H. Kramer

George Sutter

"In My Gondola"-----	Quartet
"Where Is My Rose of Wakiki"-----	Quartet
"She's My Cornfed Indiana Girl"-----	Al. Sutter and Quartet
"The World Is Waiting for the Sunrise"-----	Frank Becker and Quartet
"Harmony Hash"-----	Quartet

In the course of the program, Mr. Frank J. Lanahan, a past president of the Club, was introduced to show and demonstrate a new electric type Victrola.

MR. FRANK J. LANAHAN: Mr. Chairman and members of the Railway Club, I do not know just what Mr. VanVranken had in mind when he designated me to appear on the program, unless it be that as he had representatives of the Pennsylvania Railroad, the Baltimore & Ohio Railroad, the Monongahela Connecting Railroad, the Bessemer & Lake Erie Railroad, the Pittsburgh and Lake Erie Railroad, that he wants me to stand for the P. C. & Y., the Pittsburgh & West Virginia and the Montour Railroad. Unfortunately for those railroads, I am not able to "Zoom, zoom, zoom on the big bass viol."

I believe there are members of this organization who have not heard the new orthophonic victrola, which is a mechanical musical masterpiece. We are going to supply some music from one of these instruments tonight, and with your permission we will bring it out on the stage so you can see as well as hear, those marvelous records that are prepared electrically to reproduce sound without a vibration or squeak, which is so often associated with victrolas. Mr. Minnick, something seems to have gone wrong with this instrument, and as you know something about such things, will you come up here and help me adjust it?

Now the particular adjustment that is needed is to transfer the title and full ownership of this beautiful orthophonic to you. It is a time honored custom of the Railway Club of Pittsburgh to manifest some visible evidence to the retiring chief executive, of their appreciation of the faithful service that has been rendered to the organization. To me has been assigned the pleasant duty by the Committee of this evening, to present to you

on behalf of the full membership of the Club, this token as a mark of our gratitude for the splendid service you have given during your tenure of office. Proud indeed must you feel in turning over to your successor, the gavel of authority, in realizing the progress the Club has made under your able management. Its wonderful financial condition, its increased membership and its splendid good fellowship must be to you a source of joy. We only hope that in the days to come, in the quiet evenings at home when the day's work is done, in the sweet spirit of domestic tranquility, the dulcet tones of this instrument will bring back to you happy memories of the days you have spent as the presiding officer of this organization. An perchance the scenes of tonight come back to you with all these smiling faces and warm hearted friends, may you feel repaid for your efforts and glad indeed for this evidence to you of our appreciation and token of regard.

PRESIDENT: Mr. Lanahan and Fellow Members of the Railway Club of Pittsburgh: I do not know what to say. While I realized, because of my past membership in the Club and from having been present on other similar occasions, that some remembrance to the retiring President might be given, somehow I must have overlooked it, for I was not looking for it. My interest has been centered on these reports and upon this program tonight, because I felt that it was going to be something to remember always. But this wonderful gift is so wholly unlooked for that I am utterly at a loss for words to express my feelings. I know there are more wonders in store for you on the regular program and I do not want to take much time—in fact I do not want to take any.

But let me say this, that no President of the Railway Club of Pittsburgh ever enjoyed better support or greater loyalty from both officers and members than I have had. I tried, in keeping with what I felt to be my responsibility, to point the way that might make for the best interests of the Club. Poor indeed would have been those gestures had it not been for the support of the officers who had to do the work, and the equal support of the individual members of the Club. I think the attendance tonight demonstrates to all of you just how much that interest is in the Railway Club of Pittsburgh. The financial showing is fine, and we are proud of it. But we have done a lot more than merely accumulate a surplus. Money does not mean much, compared with the accomplishment of another

thing we set out to do, and that is the promotion of good fellowship within the Railway Club of Pittsburgh, and I know we have done that.

Mr. Lanahan, and fellow officers and members of the Railway Club of Pittsburgh, I accept, with a very great appreciation, this most wonderful gift. What I have done in my humble way does not deserve such a remembrance. Nevertheless it is accepted I believe in the spirit in which it is given. I want you to know that in the years to come my good wife and I will sit at home many, many nights and listen to the beautiful music, and we will keep in mind every minute of the time the wonderful spirit that presented it.

All I wish to say further is that as you have been good enough to elect me a member of the Executive Committee, if there is anything I can do in that position to promote the interests of the Railway Club of Pittsburgh, I will do my best, keeping in mind all the time the furtherance of the good spirit and the good fellowship of The Railway Club of Pittsburgh and its good influence on the population of Pittsburgh through its twelve hundred members. Gentlemen, I thank you.

MR. D. F. CRAWFORD: On behalf of the Railway Club of Pittsburgh I desire to make a motion that we express by rising vote our thanks and appreciation to those who have so splendidly entertained us this evening and also to the Entertainment Committee for the very excellent entertainment they have provided for us.

MR. LANAHAN: In seconding the motion, I think it would be almost criminal not to embrace the opportunity for making certain comments on the Railway Club of Pittsburgh. I believe you were struck, as was I, by the appearance of a general manager and a brakeman in the same entertaining program tonight. The fellowship of the head of the organization with one from the humbler ranks, the man who works with his hands and the man who sits in a swivel chair—in what other organization in this country can you find truer Americanism so fully typified, as right here in the Railway Club of Pittsburgh? The purpose of my remarks is to bring home to you who are not acquainted with the fact that the annual dues of this organization amount to the magnificent sum of three dollars a year, for which you are furnished nine meetings a year, with the splendid presentation of interesting and important subjects, by men who

are the best qualified to talk on them, where you have the privilege and opportunity of rubbing elbows with the men who guide the industry and men who handle the tools. And there is a lunch provided at every meeting. How Mr. Conway does it with the Three Dollars we pay him, is one of the dark mysteries of the ages. And you who know the Club, who belong to it and know its advantages and have enjoyed its various features, owe it both to the Club and to your friends, to tell them its worth, extend to them a welcome and invite them into its membership.

Gentlemen, I wish to second Mr. Crawford's motion and say that tonight we certainly have been favored with high class entertainment of a character that leaves a sweet taste in our mouths, and as we go home, know we have been associating with members composing one of the greatest railroad clubs in existence anywhere in the country.

The motion prevailed by unanimous rising vote.

PRESIDENT: This closes the program and the 1926 Smoker of the Railway Club of Pittsburgh will now stand adjourned.

J. D. CONWAY, Secretary.

CONSTITUTION

ARTICLE I

The name of this organization shall be "THE RAILWAY CLUB OF PITTSBURGH."

ARTICLE II

OBJECTS

The objects of this Club shall be mutual intercourse for the acquirement of knowledge, by reports and discussion, for the improvement of railway operation, construction, maintenance and equipment, and to bring into closer relationship men employed in railway work and kindred interests.

ARTICLE III

MEMBERSHIP

SECTION 1. The membership of this Club shall consist of persons interested in any department of railway service or kindred interests, or persons recommended by the Executive Committee upon the payment of the annual dues for the current year.

SEC. 2. Persons may become honorary members of this Club by a unanimous vote of all members present at any of its regular meetings, and shall be entitled to all the privileges of membership and not be subject to the payment of dues or assessments.

ARTICLE IV

OFFICERS

The officers of this Club shall consist of a President, First Vice President, Second Vice President, Secretary, Treasurer, Finance Committee consisting of five or more members, Membership Committee consisting of seven or more members, Entertainment Committee consisting of three members, Reception Committee consisting of six or more members, Subject Committee consisting of three or more members, and an Elective Executive Committee of three or more members. The officers named shall serve a term of one year from date of their election, with the exception of the Finance, Membership, Entertainment, Reception and Subject Committees; the term of office of these committees shall be specified at the time of the Annual Election, but the term

of office of the members of such committees shall not exceed three years.

ARTICLE V

DUTIES OF OFFICERS

SECTION 1. The President shall preside at all regular or special meetings of the Club and perform all duties pertaining to a presiding officer; also serve as a member of the Executive Committee.

SEC. 2. The First Vice President, in the absence of the President, will perform all the duties of that officer; the Second Vice President, in the absence of the President and First Vice President, will perform the duties of the presiding officer. The First and Second Vice President shall also serve as members of the Executive Board.

SEC. 3. The Secretary will attend all meetings of the Club or Executive Committee, keep full minutes of their proceedings, preserve the records and documents of the Club, accept and turn over all moneys received to the Treasurer at least once a month, draw cheques for all bills presented when approved by a majority of the Executive Committee present at any meetings of the Club, or Executive Committee meeting. He shall have charge of the publication of the Club Proceedings and perform other routine work pertaining to the business affairs of the Club under the direction of the Executive Committee.

SEC. 4. The Treasurer shall receipt for all moneys received from the Secretary, and deposit the same in the name of the Club within thirty days in a bank approved by the Executive Committee. All disbursements of the funds of the Club shall be by cheque signed by the Secretary and Treasurer.

SEC. 5. The Executive Committee will exercise a general supervision over the affairs of the Club and authorize all expenditures of its funds. The elective members of this Committee shall also perform the duties of an auditing committee to audit the accounts of the Club at the close of a term or at any time necessary to do so.

SEC. 6. The Finance Committee will have general supervision over the finances of the Club, and perform such duties as may be assigned them by the President or First and Second Vice Presidents.

SEC. 7. The Membership Committee will perform such duties as may be assigned them by the President or First and Second Vice Presidents and such other duties as may be proper for such a committee.

SEC. 8. The Entertainment Committee will perform such duties as may be assigned them by the President or First and Second Vice Presidents, and such other duties as may be proper for such a committee.

ARTICLE VI

ELECTION OF OFFICERS

SECTION 1. The officers shall be elected at the regular annual meeting as follows, except as otherwise provided for:

SEC. 2. Printed forms will be mailed to all the members of the Club, not less than twenty days previous to the annual meeting, by the elective members of the Executive Committee. These forms shall provide a method, so that each member may express his choice for the several offices to be filled.

SEC. 3. The elective members of the Executive Committee will present to the President the names of the members receiving the highest number of votes for each office, together with the number of votes received.

SEC. 4. The President will announce the result of the ballot and declare the election.

SEC. 5. Should two or more members receive the same number of votes, it shall be decided by a vote of the members present, by ballot.

ARTICLE VII

AMENDMENTS

Amendments may be made to this Constitution by written request of ten members, presented at a regular meeting and decided by a two-thirds vote of the members present at the next regular meeting.

BY-LAWS

ARTICLE I

MEETINGS

SECTION 1. The regular meetings of the Club shall be held at Pittsburgh, Pa., on the fourth Thursday of each month, except June, July and August, at 8 o'clock P. M.

SEC. 2. The annual meeting shall be held on the fourth Thursday of October each year.

SEC. 3. The President may, at such times as he deems expedient, or upon request of a quorum, call special meetings.

ARTICLE II

QUORUM

At any regular or special meeting nine members shall constitute a quorum.

ARTICLE III

DUES

SECTION 1. The annual dues of members shall be Two Dollars, payable in advance on or before the fourth Thursday of September each year.

SEC. 2. The annual subscription to the printed Proceedings of the Club shall be at the published price of One Dollar. Each member of the Club shall pay for both dues and subscription. Dues and subscription paid by members proposed at the meetings in September or October shall be credited for the following fiscal year.

SEC. 3. At the annual meeting members whose dues and subscription are unpaid shall be dropped from the roll after due notice mailed them at least thirty days previous.

SEC. 4. Members suspended for non-payment of dues shall not be reinstated until all arrearages have been paid.

ARTICLE IV

ORDER OF BUSINESS

- 1—Roll call.
- 2—Reading of the minutes.
- 3—Announcements of new members.
- 4—Reports of Committees.
- 5—Communications, notices, etc.
- 6—Unfinished business.
- 7—New business.
- 8—Recess.
- 9—Discussion of subjects presented at previous meeting.
- 10—Appointment of committees.
- 11—Election of officers.
- 12—Announcements.
- 13—Financial reports or statements.
- 14—Adjournment.

ARTICLE V

SUBJECTS—PUBLICATIONS

SECTION 1. The Subject Committee will provide the papers or matter for discussion at each regular meeting.

SEC. 2. The Proceedings or such portion as the Executive Committee may approve shall be published (standard size, 6x9 inches) and mailed to the members of the Club or other similar clubs with which exchange is made.

ARTICLE VI

The stenographic report of the meetings will be confined to resolutions, motions and discussions of papers unless otherwise directed by the presiding officer.

ARTICLE VII

AMENDMENTS

These By-Laws may be amended by written request of ten members, presented at a regular meeting, and a two-thirds vote of the members present at the next meeting.

MEMBERS

- Aaron, C. T.,
P. & L. E. R. R.,
815 Romine Avenue,
McKeesport, Pa
- Abbott, J. A.,
Asst. Trainmaster,
Western Maryland Rw.,
Cumberland, Md.
- Adams, Frank T.,
Rwy. Salesman,
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202 Fitzsimmons Bldg.,
Pittsburgh, Pa.
- Adams, F. W.,
Local Storekeeper,
B. & O. R. R.,
Watson St.,
Hays, Pa.
- Adams, Lewis,
Clerk, P. S. C. Co.,
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- Adams, Walter A.,
Lubrication Inspector,
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- Agnew, Robert L.,
Yardmaster, P.R.R. System,
148 Tioga St.,
Westmont,
Johnstown, Pa.
- Aiken, Glen A.,
Vice President,
American Nut and Bolt
Fastener Co.,
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- Ainsworth, J. H.,
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- Allan, W. J.,
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Co. of America,
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- Allderice, Norman,
Sales Mgr., Manning Max-
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- Allen, E. J.
Salesman, Ingersoll-Rand
Company, 706 Camber
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- Allen, Harvey
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- Allen, Jas. P.,
President,
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62nd and Butler Sts.,
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- Allen, Raymond Lee
E. H. Foreman,
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California, Pa.
- Allison, John,
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Pgh. Steel Foundry Corp.,
Glassport, Pa.
- Altman, C. M.,
Foremen Car Inspectors,
Penna. R. R. System,
Grapeville, Pa.
- Altmeyer Harry,
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Wireton,
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Penna. System,
Derry, Pa.

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Carnegie Steel Co.,
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49th St. and A. V. Ry.,
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Pres. Water Treatment Co. of
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Motor Truck Dept.,
Standard Steel Car Co.,
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Baily, J. H.
Secy., Edgewater Steel Co.,
Oakmont, Pa.

Bain, Geo. F.,
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Rankin, Pa.

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Thaw Bldg.,
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Yard Clerk, P. & L. E.
R. R., Lincoln & Walnut
Streets, Versailles, Pa.

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Forged Steel Wheel Co.,
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Butler, Pa.
- Beach, Earl B.
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Oliver Bldg.,
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- Beam, E. J.,
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- Beattie, J. A.,
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- Beltz, John D.,
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So. Windsor Apts.,
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Wilkinsburg, Pa.
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Westinghouse Air Brake
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- Biggard, W. J.,
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- Blackmore, G. A.,
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- Blume, W. A.,
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- Boyle, Edward A.,
Salesman, The Okonite Co.,
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- Brosius, E. E.,
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Smith field and Water
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- Burkhard, Raymond L.,
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- Burns, Thomas F.,
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- Button, D. G.,
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OF CONGRESS OF AUGUST 24, 1912.

Of Official Proceedings—Railway Club of Pittsburgh, published
Monthly, except June, July and August, at Pittsburgh, Pa., for
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Before me, a Notary Public in and for the State and county
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having been duly sworn according to law, deposes and says that
he is the Editor and Publisher, of the Official Proceedings—
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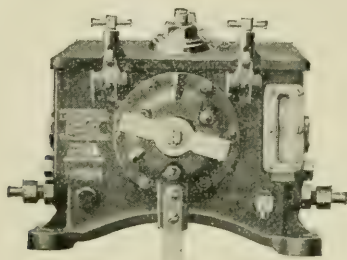
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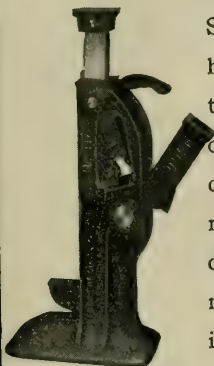
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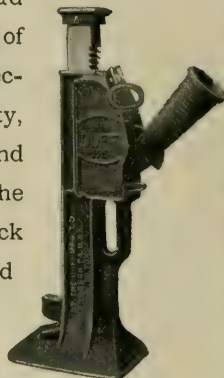


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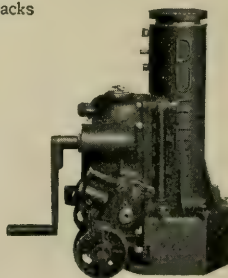
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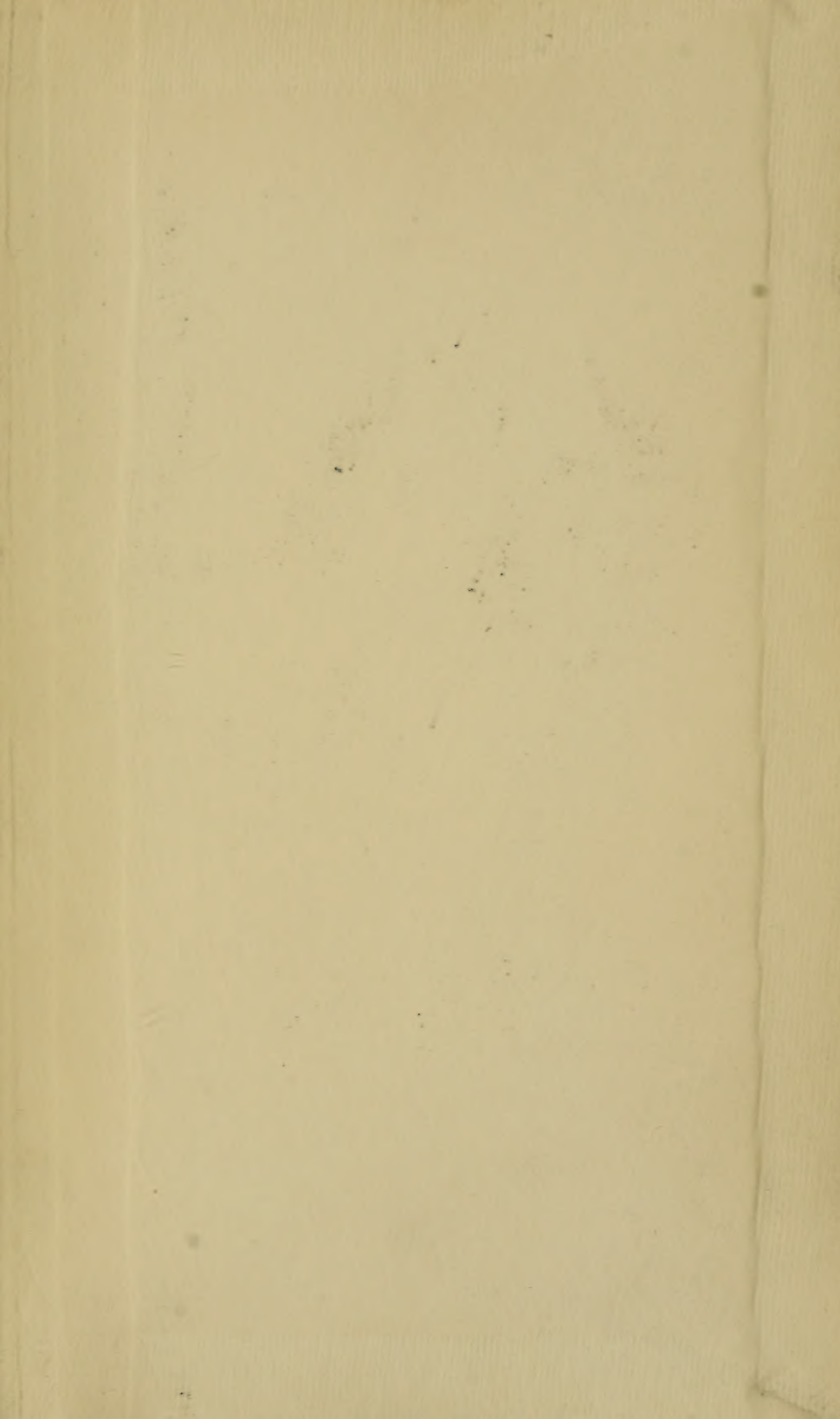
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